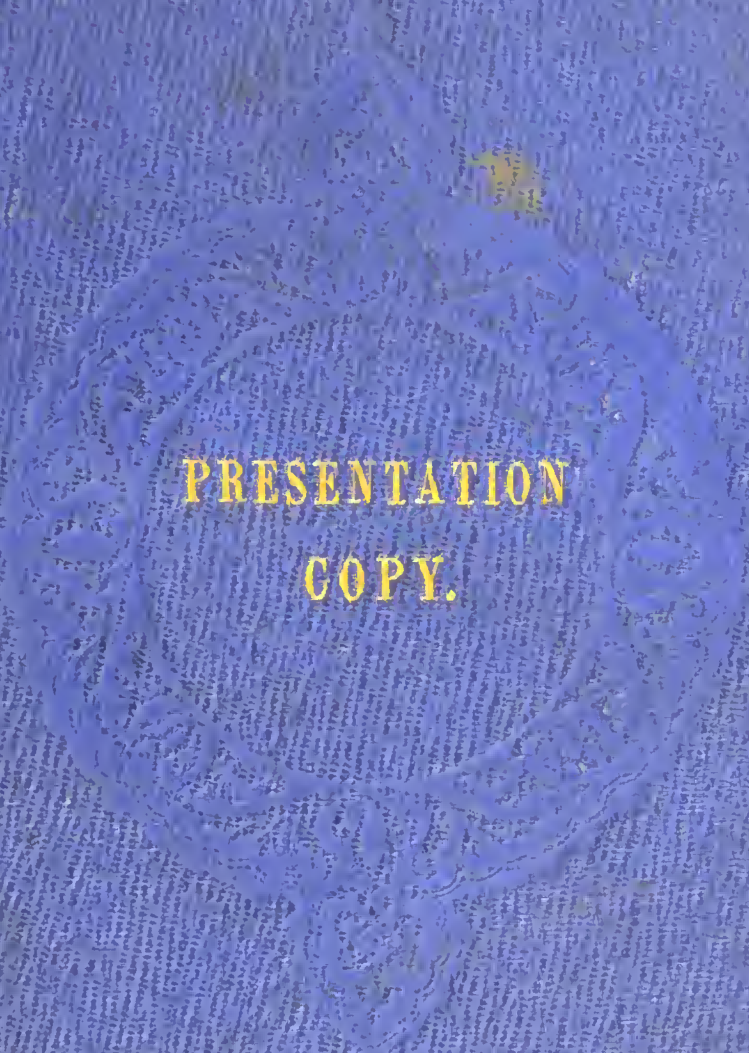

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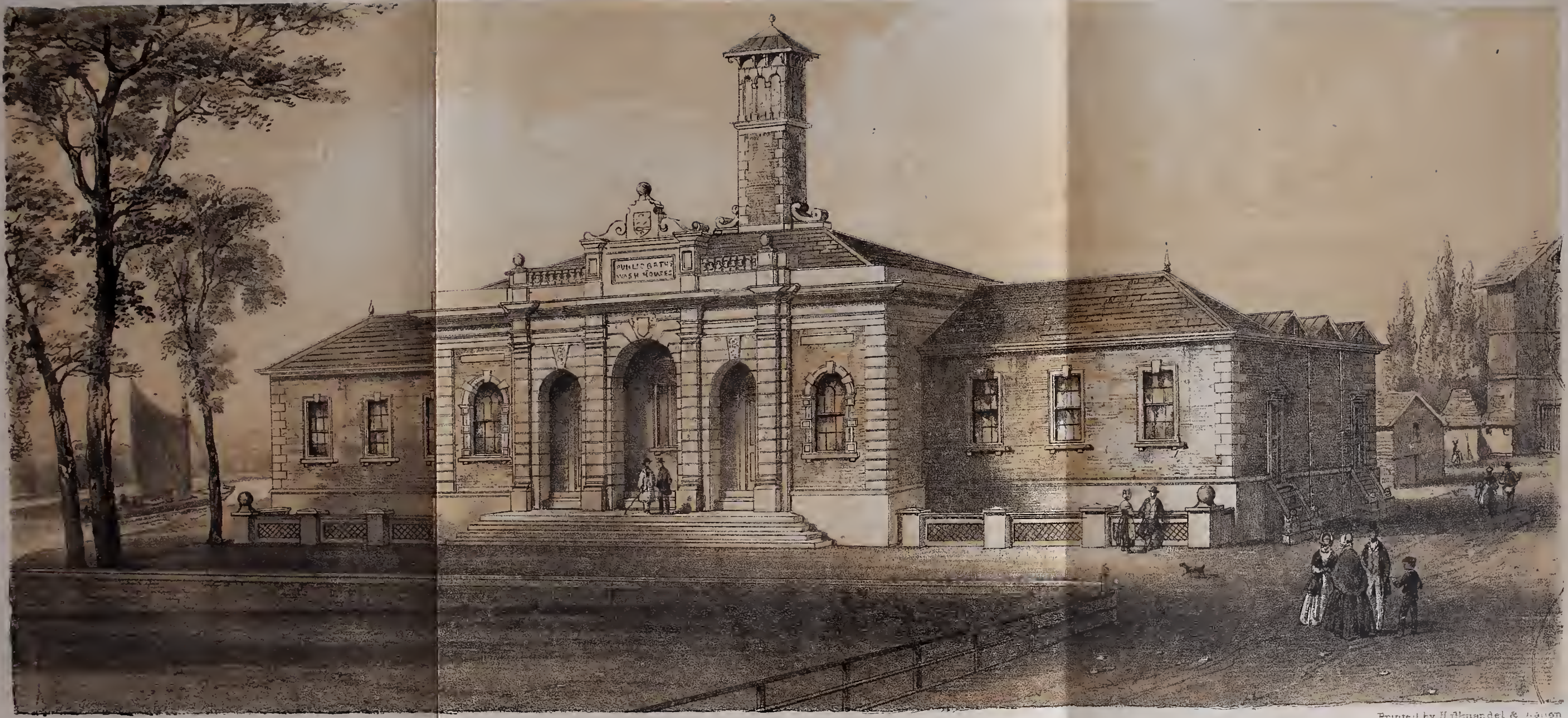
BATHS AND WASH-HOUSES.



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Perspective View of

PUBLIC BATHS AND WASH-HOUSES,

AT

Maidstone.

ASHPITEL & WHICHCORD, Architects
8 Carlton Chambers - James.

BATHS AND WASH-HOUSES;

AN

ACCOUNT OF THEIR HISTORY;

AN ABSTRACT OF THE

Acts of Parliament relating thereto;

THEIR APPLICABILITY AND ADVANTAGE TO PROVINCIAL TOWNS;

AND A

DESCRIPTION OF THOSE ERECTED UNDER THE SUPERINTENDENCE OF THE AUTHORS.

TO WHICH IS PREFIXED

AN ACCOUNT OF THE BATHS OF THE ANCIENTS.

> " ———— labentibus obvius undis
> Carpe viam, donec venias ad fluminis ortus,
> Spumiferoque tuum fonti, quâ plurimus exit,
> Subde caput: corpusque simul, simul elue crimen."
> Ovid. Met. lib. xi. 141.

BY

ARTHUR ASHPITEL AND JOHN WHICHCORD,

FELLOWS OF THE SOCIETY OF ANTIQUARIES; FELLOWS OF THE ROYAL INSTITUTE OF
BRITISH ARCHITECTS; ASSOC. INST. CIVIL ENGINEERS, ETC. ETC.

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INTRODUCTION.

In presenting this work to our readers, we cannot refrain from expressing our satisfaction at the manner in which our former attempt has been received by the public. Three successive editions have been called for in a short space of time, the last of which was published at a low price, for general circulation. The public interest increases on the subject,—not only in its direct form, but in every research bearing on it,—and we have been requested by the Architectural Publication Society to remould our former work for their pages, and to prefix to it an account of those wonderful buildings, the *Public Baths of the Ancients.* If the active exercise of our laborious profession has stinted us of time to make the fullest researches, and if the classic critic, in the leisure of his study, should complain there may be more that could have been said, we hope the practical knowledge acquired during the erection of similar works in this country has given an insight into the requirements which necessarily arose in past ages, as well as the present, and has thrown new light upon what has hitherto been obscure. Like everything connected with classic antiquity, the subject of Public Baths has had numerous commentators. The principal of these, Mercuriali and Cameron, wrote previously to the late discoveries at Pompeii, and the vast additional light thrown by these on the manners and customs of antiquity. Besides this, the laws of heating, and circulation of water, and that which we have ventured to call the engineering branch of the subject, were so imperfectly understood, that much error and confusion were found in all the treatises. However imperfect our little work may be, it is hoped it has added somewhat more to this most useful and interesting branch of public health.

Since the number of the Architectural Publication Society's work, for which this Essay was written, has been published, the following official returns have been issued:—

"I. An Account of the Bathing and Washing at the Establishments in London which are conducted under, or in accordance with, the Acts 9 and 10 Victoria, chap. 74, and 10 and 11 Victoria, chap. 61, and at a few out of the many similar Establishments in the country:—

Name and title of the Establishment.	Lady-Day Quarter.			Midsummer Quarter.			Michaelmas Quarter.			Christmas Quarter.		
METROPOLIS.	£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.
The Model, Whitechapel	547	4	3	805	0	9	1,010	17	5	528	19	2
St. Martin-in-the-fields..........	782	19	3	1,124	9	9	1,126	18	2	619	19	11
St. Marylebone ..	382	4	1	740	1	2	1,040	2	11	368	10	3
St. Margaret and St. John, Westminstr	246	4	6	503	14	1	803	2	9	330	7	1
Greenwich	107	4	0	256	7	3	508	9	9	152	1	8
St. James', Westminster (opened June 12)	——			79	10	11	620	15	9	303	3	7
Poplar (opened July 19)	——			——			280	8	0	144	10	9
Totals	2,055	16	1	3,509	3	11	5,390	14	9	2,447	12	5
COUNTRY.												
Liverpool												
*Cornwallis St.	241	12	3	470	13	11	643	18	3	242	8	9
Paul Street	107	12	6	180	15	10	299	15	11	131	19	8
Hull	122	7	10	189	10	9	256	6	7	109	5	8
Bristol	127	17	9	169	0	7	210	19	2	90	1	1
Preston..........	60	8	4	96	15	0	174	17	6	60	8	7
Birmingham	146	3	8	421	3	10	834	10	11	195	18	4
Maidstone (opened May 24)	——			67	0	8	151	5	2	57	14	10

METROPOLIS.

	Total Receipts.		
The Model, Whitechapel	£2,892	1	7
St. Martin-in-the-fields	3,654	7	1
St. Marylebone	2,530	18	5
St. Margaret and St. John, Westminster	1,883	8	5
Greenwich	1,024	2	8
St. James', Westminster (opened June 12)	1,003	10	3
Poplar (opened July 19)	424	18	9
	£13,413	7	2

COUNTRY.

Liverpool			
*Cornwallis Street	£1,598	13	2
Paul Street	720	3	11
Hull	677	19	10
Bristol	597	18	7
Preston	395	9	5
Birmingham	1,598	5	9
Maidstone (opened May 24)	276	0	8

* The washhouses at the Cornwallis Street establishment are not yet completed.

"II. A statement showing the steady increase of bathers and washers in London:—

	Bathers.	Washers.
The aggregate numbers at seven establishments in the metropolis, from January to December 1852, inclusive, amount to	800,163	197,580
Corresponding period of 1851, five establishments	647,242	132,251
Corresponding period of 1850, three establishments	509,200	60,154
Corresponding period of 1849, two establishments	297,831	9,070
Corresponding period of 1848, one establishment (Goulston Square, Whitechapel)	48,637	—
Showing an increase in 1852 over the corresponding period of 1848 of	751,526	197,580

And an aggregate in five years of more than 3,100,000 bathers and washers.

"The figures in the foregoing statements are irrespective of the bathers and washers at the George Street establishment, which is not conducted according to the acts."

This table fully corroborates the estimated success of Baths and Washhouses, and stamps as facts many of the statements contained in the following Essay. The account above referred to is commented upon in a leading article of the *Times* of the 29th January, and we cannot select more pertinent language, which we therefore extract:—

"Our expectation that these new institutions would be accepted as a great boon by the working population of the metropolis, and of the larger provincial towns, has been fully verified, as may be seen by reference to the Report of the Committee. We find that there has been an aggregate of upwards of 3,000,000 washers and bathers during the last five years. Even this collective figure, large as it is, but feebly represents the prospects for the future. In 1848—the first year of the period in question—only one establishment, that of Goulston Square, Whitechapel, had been opened to the public, and for bathers alone. The number under this head was 48,637. In 1849 there were two establishments, which have returned for that year 297,831 bathers, 9,070 washers. In 1850 there were three establishments, which gave accommodation to 509,200 bathers, and 60,154 washers. The increase under the last head is not a little remarkable. In 1851 there were five establishments—647,242 bathers, and 132,251 washers. Finally, in the year 1852, with seven establishments at work, the returns are swelled to 800,163 bathers, and 197,580 washers. Surely there could not be stronger evidence of the value set by the poorer classes of our countrymen upon these institutions, than the steady and rapid increase in the numbers of those who have sought to avail themselves of the privilege. It is a libel, we believe, upon any section of human beings to say they love dirt for dirt's sake. Bad habits, want of occasion, want of means, may induce people to acquiesce in personal uncleanliness—nothing more. After a time its evils may not be felt as a serious inconvenience, but certainly no man who has once enjoyed the inestimable advantages of bodily purity will willingly sink into filth and discomfort. There is this further advantage in the matter, that cleanliness is that virtue which of all others has a tendency to propagate itself. The man who has just stept out of a bath will not put on a dirty shirt if he can help it, and the happy possessor of a clean shirt will not assume the spotless covering before he has performed certain ablutions in honour of the garment and the occasion. The rest of the dress will next be brought into congruity with the clean body and clean linen, and when this is done, the tidy labourer or mechanic will endeavour to bring his dwelling-place into keeping with his attire. It would be idle in us to follow out a catalogue of consequences which must be familiar to every one who moves about the world with his eyes open. Dirty people live in dirty houses, and clean people in clean houses. Dirty houses and sick houses are interchangeable terms, and the gentleman who presides in chief over the Bills of Mortality can tell the rest. More especially are these points deserving of consideration when we are speaking of town populations. There is no set-off against dirt and confinement in filthy dwellings, as in the country—no keeping of sheep, as on the Wiltshire downs—no 'following the plough'—no driving of the herds a-field. If in towns cleanliness in person and in dwelling-house be wanting, the result is unmitigated muck, poison, and disease.

"Another fact, to which we would also point attention, is, that these institutions have strictly verified the predictions of their founders and advocates in another particular — they have become self-supporting establishments. The receipts for the last year, in the metropolis alone, have amounted to the very considerable sum of £13,413 7*s.* 2*d.*—a sum quite large enough, we believe, to meet all the expenses incurred. Thus, then, a benefit of the most important kind has been conferred on the poorer classes, and they are able and eager to pay the cost for themselves. What has been done in this instance is merely a repetition of the club system of the luxurious west-end, in another form. How is it that the half-pay captain, or the young barrister, rich only in expectations, can enjoy all the substantial comforts of a man with £10,000 a-year? Simply by concocting measures with persons in the same predicament as himself, and by uniting purses with them for a common object. This is exactly what the poorer classes are now doing for themselves. Of course, in their case, it was necessary that persons of benevolent and philanthropic feeling, more abundantly blessed with the world's goods than they are themselves, should come forward to give the first impulse. In the same manner the engineer must by a simple pressure start the engine, which will then run on alone. This has happily been done, and the pleasing duty of congratulating all persons who have taken an interest in the 'cleanliness movement,' upon the success of their endeavours, is all that strictly remains for us to do. But we would not willingly stop here. We are of opinion that the countenance and advice of the more opulent classes will still have great effect in extending yet more widely the blessings of so desirable a system. This, at least, is no project, no delusion. The poor are flocking to these baths and wash-houses, and are perfectly willing and able to pay for the accommodation they receive. But we look even beyond the extension of institutions of this kind. We consider the success of this rational endeavour to benefit the working classes but as a blessed earnest of what may be accomplished in other particulars by helping them to the system of co-operation for mutual aid. Why should not the same principle be extended to their dwellings in a far greater degree than has yet been attempted, and to other similar designs? We are perfectly aware that such propositions are in course of being practically worked out, and we would point to the success of the public baths and wash-houses as the greatest encouragement that could be afforded to all who lend their assistance to such benevolent and reasonable designs."

We also find a report of the Sunderland Baths and Washhouses, exhibiting a similarly satisfactory result in a provincial town; and we doubt not that when the reports for 1852 appear, others equally satisfactory will present themselves. At Sunderland, the establishment has been opened a year and nine months, and has been self-sustaining from the commencement. The current expenditure of the last half year is reported at £182: 11 : 8, against an income of £215 : 18 : 9. It is further stated, that the establishment was shut up for a fortnight for cleaning, etc., and that the profits but for that would have amounted to £51 : 7 : 1. This for a commencement in a provincial town is satisfactory, especially when we learn further that the average weekly receipts in 1851 was £6 : 12 : 6; but that this average in 1852 rose to over £9.

The above results are the more cheering, as all these establishments, when in their infancy, have been met by prejudices of every kind, and in many instances have been crippled by extravagant sums wasted in building. It now appears certain that, with proper economy in their original expenditure, they are not only self-supporting, but paying speculations: we confidently hope to see these inducements to health and cleanliness erected in every town in the kingdom.

2, Poet's Corner,
Old Palace Yard, Westminster.

BATHS AND WASH-HOUSES, BILSTON, NEAR BIRMINGHAM.

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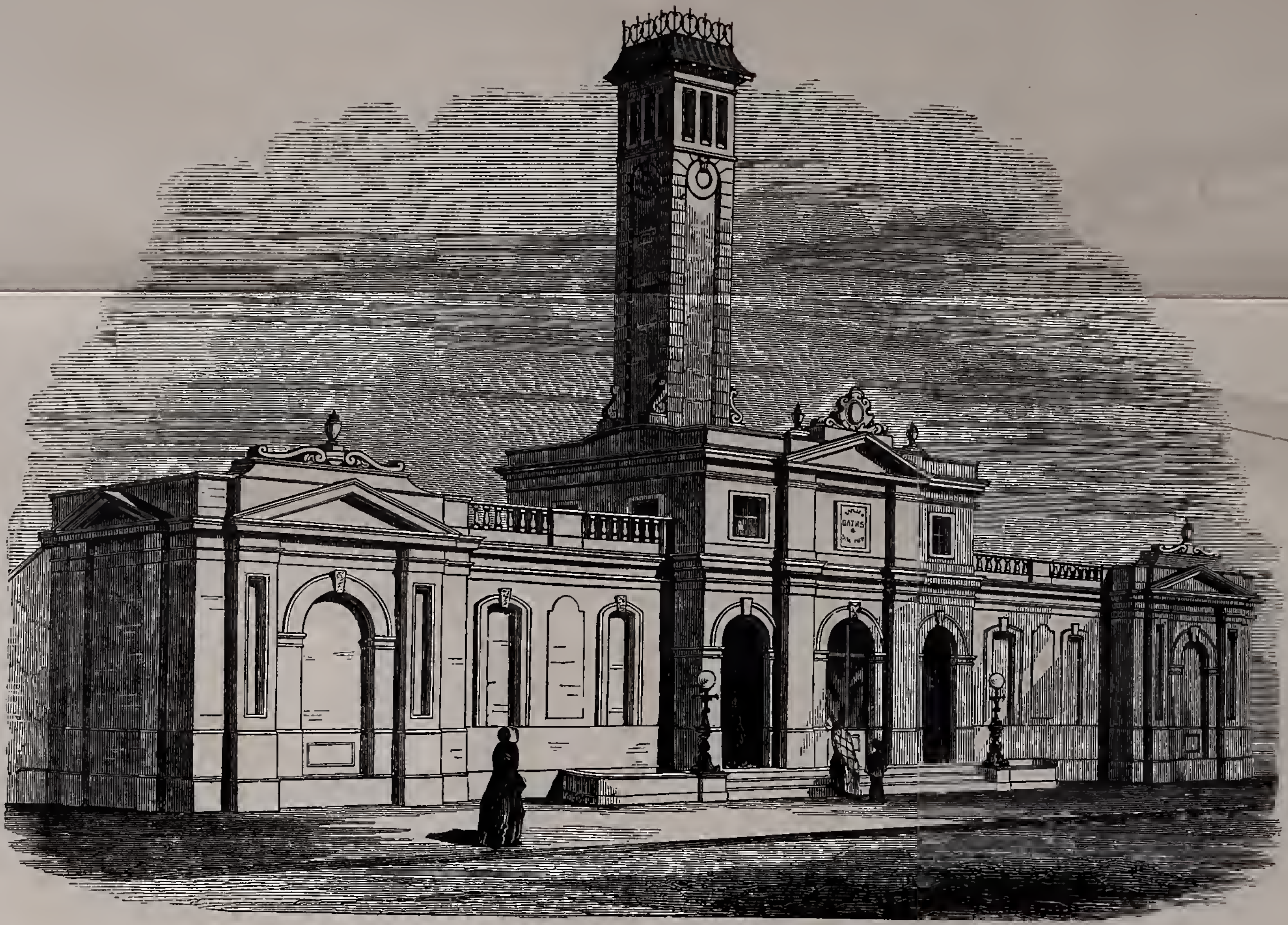
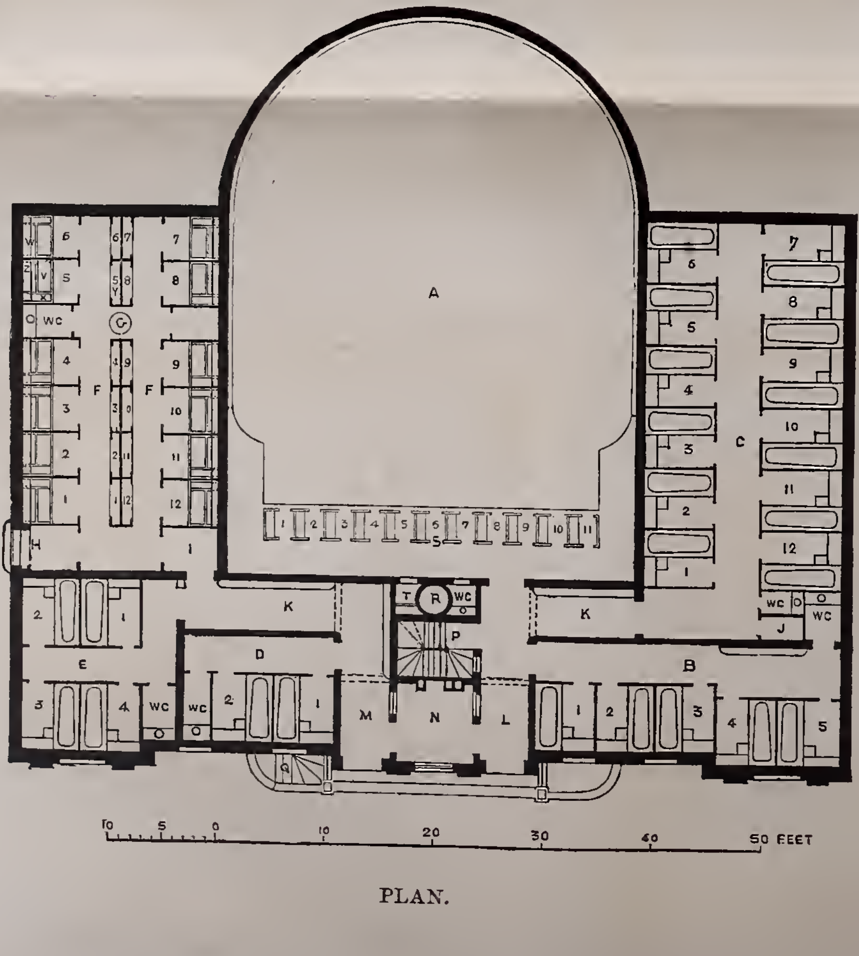




PLAN.

REFERENCES.

A. Swimming-bath.
B. Five men's baths—first class.
C. Twelve men's baths—second class.
D. Two women's baths—first class.
E. Four women's baths—second class.
F F. Wash-house, twelve compartments.
G. Wringing machine.
H. Entrance to Wash-house.
I. Office.
J. Soap, &c.
K. Lobby.
L. Men's entrance.
M. Women's entrance.
N. Office.
P. Bath-keeper's entrance.
Q. To the stokery.
R. Chimney-shaft.
S. Dressing-boxes.
T. Urinal.
V. Wash-tub.
W. Boiling-tub.
X. Rinsing-tub.
Y. Drying-closet.
Z. Dripping-board.

BATHS AND WASHHOUSES.

BATHS (ANCIENT). In the early stages of civilization there is no doubt that the only form of bathing used was the simple plunge into a river, or clear pool. In severe weather this would be too cold for the sick and infirm; and as society advanced in the arts of life, the improvements in constructing pottery or metal vessels no doubt suggested to these persons the use of warm water; and as luxury generally increases as the means of indulgence are discovered, it is probable the healthy in cold weather also availed themselves of the invention. As early as Homer's days, it is evident, from the speech of Aleinöus to Ulysses (*Odyssey* viii, 249) the warm baths, *λοέτρα τε θερμὰ*, were considered effeminate, and as late as those of Aristophanes, in the memorable contest between "Reason" and "Quibble" (as the *δίκαιος λὸγος* and *ἄδικος λογος* may be translated, *Nubes*, 879), it is evident that feeling lingered long in the minds of the Greeks. As population grew denser it was more difficult to preserve the decencies of life, and separate bath-rooms were used; and the economy and convenience of uniting single buildings into large public establishments gave origin to those noble piles, the principal ornaments of cities of the Roman world.

Lavers (כיר) of brass among the Jews (Exodus xxxviii, 8), are noticed, but neither in the Scripture nor the Apocrypha, are separate establishments mentioned. The Egyptians were forbidden (Diodorus 1, 72) to bathe while in mourning; but Sir Gardner Wilkinson confesses there is but little knowledge of their baths: he gives (*Manners and Customs of the Ancient Egyptians*, vol. iii, 389) an engraving from a tomb at Thebes, representing a lady kneeling in a shallow vessel, while her attendants pour water on her, and seem to be rubbing her arms and shoulders. In the classic authors we have numerous and copious allusions to the subject, which have excited the greatest attention and closest controversy.

Confining the investigations as much as possible to the buildings and apparatus, an attempt will be first made to give a short sketch of the etymology of the terms used by the ancients, and what is known of the history of these establishments; afterwards to endeavour to elucidate at greater length their architectural and engineering features.

Baths were called by the Greeks *ασάμινθος, βαλανεῖον, ἔμβασις, λοετρόν, λουτρόν, πύελος*, and *πύρια* or *πυρίατηριον*. Πλύνος has another meaning, to be explained presently.

Ασάμινθος, probably from *ἄσις*, mud, dirt, because the bath removes it, is a word frequently used by Homer. When Ulysses and Diomede return from the night expedition (*Iliad* x, 574), they first bathe in the sea, and next in the *ασάμινθος ἐΰξεστας*, "polished baths," they then are anointed with rich oil. When Ulysses bathes in Circe's palace (*Od.* x, 359 *et seq.*) one of her attendants "brought water, and kindled fire, and heated much water on a great tripod, but when the water bubbled in the shining brass, sitting in the *ἀσάμινθον*, she poured from the great tripod, sweetly mixing [the hot and cold water] and bathed my head and my shoulders, that from me she might take away the mind-wasting labour, but when I was washed I was anointed with fat oil." It is probable this vessel was something like the Roman "labrum" in which the bathers sate and had water poured on them from different vessels. Athenæus (1 *pag.* 24, *Ed. Casaub.*) alluding to this passage of Homer, calls the ἀσάμινθος ἔμβασις. This last is a common word for a shoe, and would lead to the notion that the vessel was of long form—in fact a sort of slipper-bath. Julius Pollux (*Onomas,* 10, 64, 65, *Ed. Hemsterhuis:*) in a much corrupted passage, seems to infer that ασάμινθος is the same as λέβης; but he says in the next sentence that in "the Heroes" of Cratinus, ἀσάμινθος signifies a chest, and that some suppose it to be a sort of cup, κιβωτὸν νοοῦσιν, ἔνιοι δὲ ἔκπωμα. The same author, treating of cups (*Onomas.* lib. vi, 97, 99) considers the ἀσάμινθον given to Menelaus (*Odyss.* iv, 128) to be a species of χύλιξ, but this seems quite begging the question. Nothing in the context points to cups more than to any other vessel. He also cites Cratinus (*Chirones*) ’Εξ ἀσαμίνθον κύλικος λέιβων: but as the play is lost there is no context to guide one in so short a passage.

Βαλανεῖον, "derived," says the Etymologicon Magnum (*sub voce*) "as ιατρεῖον, from ἰατρός, seems to have been the name of the bath-room rather than of the bath itself, (see *Equites,* 1055, cited further on) and is stated on the authority of Suidas (*sub voce*) to be derived from βάλανος, an acorn, because the baths were heated by burning the cups, etc., of the acorns, the fruit itself being eaten in those days as food. Others have derived it partly from a passage in S. Augustine (*Confessions,* cap. 12) from βαλλειν, "quia pellat anxietatem animi:" this seems a far-fetched reason, and as Philander (see his notes to the folio Elzevir Vitruvius, p. 95) says "cui sententia refragatur orthographia." Be its derivation what it may, it is no doubt the etymology of the Roman terms "Balineum," "Balineæ," contracted to "Balinum," "Balneæ." The other Roman word "Thermæ" is derived from the Greek adjective for "warm" (*sc.*) baths, as a glance will show.

Ἔμβασις has already been mentioned.

Λοετρόν, and λουτρόν, are of course directly derived from λοέω, the Homeric form of λούω, to wash. Some critics have considered λουτρόν to signify a warm bath, and the ἀσάμινθος to signify a cold bath, but VITRUVIUS (lib. v. cap. ii.) says distinctly "frigida lavatio quam Græci 'λουτρόν' vocitant," and that which much strengthens his testimony, HOMER (*Iliad*, xviii, 489) speaks of "λοετρῶν Ωκεανοῖο." The Ἡράκλεια λουτρά were warm baths. There is a tradition that they were natural warm baths shown to Hercules by Pallas (see the Scholiast on the before-cited passage of the *Nubes*, 1033.)

Πύελος, this HEN. STEPHENS derives from πυοῖς or πυροῖς, a vessel made for the fire. The Scholiast, on Aristophanes *Equites* 1055, says πύελους τὰς ἐμβάσεις, the same word which Athenæus considered equivalent to the ἀσάμινθος of Homer. The Scholiast goes on to describe it as "a hollow vessel, πύελος γὰρ ὄρυγμα, where people are washed," and JULIUS POLLUX (vii. 166-169) seems to consider it the same.

This author also speaks of the last sort of bath, πυρία, as described by HERODOTUS, and πυριάματα as described by PHILISTUS. Of the latter author there are no remains: the former describes the πυρία thus (*Melpomene* 74). He states the Scythians set up three sticks and cover them with cloth like a tent; they place a quantity of red-hot stones under this covering, and taking some handfuls of the seeds of a species of hemp, they creep in under the covering, and throw the seeds on the red-hot stones, so that a smoke arises thence such as no Greek πυρίη, vapour-bath, could exceed; that they rejoice so in this vapour they shout aloud; that this is their bath, λουτρὸν, and that they never bathe their bodies in water.

There are thus three sorts of baths described—cold, hot, and vapour. The Lacedæmonians seemed to have bathed daily in the Eurotas, however cold the weather might be, and the versatile ALCIBIADES (*Plut. in vitâ*) seems to have excited their admiration by falling in with this custom. They seem also to have used a dry sweating-bath to a great extent, called from thence "laconicum," and which will be hereafter described.

The other species of bathing seems to have been like that described in the *Odyssey*, the sitting in a large vessel, and having hot or cold water poured on the body by attendants, from vessels called *αρύταινα* or *αρύβαλλος*—these are both mentioned by Julius Pollux (vii. 167 and x. 63) but without particular description. From a comparison of two passages in the *Equites*, 1087 and 1090, with a fragment of Athenæus, it appears these vessels were much alike, broader at bottom than at the top, and the *αρύβαλλος* the larger of the two. It is from this last vessel the sausage-seller sees in a vision the patron goddess of Athens casting tan-liquor upon Cleon.

From a passage in Athenæus, ii. p. 501, it seems that in the middle of the baths for the women, there was an *ομφαλὸς*, in the form, he says, of a hand-bowl, *σκάφιον*, which covered the waste pipe, and on which the women sat and chatted to each other.

An error has been committed as to the Πλύνος by some lexicographers ; this is clearly the washing trough. Homer gives it this name (*Iliad* xxii, 153) as the vessel by the side of the hot streams of Scamander, where the Trojan damsels washed their linen before the coming of the Greeks. And again (*Odyssey* vi, 86) as the vessels used by Nausicaa and her attendants when they go to the river side to wash their garments, which vessels, says the poet, were always (from year to year) left there, *Ενθ' ἤτοι πλυνοὶ ἦσαν ἐπηετανοὶ.*

Washing with nitre and soap is mentioned as early as Jeremiah (ii, 22 ;) and Susanna (*Apocrypha*, v, 17) is described as taking oil and washing-balls into the garden with her to bathe there. The Greeks used a quantity of these things, as enumerated by Pollux (vii, 37, 38), the principal of which was *κονὶα*, lye, and a sort of fuller's-earth, *κιμωλία γῆ* ; all these things were called ῥύμμα, and provided, some say, by the bath keeper. But the very passage cited seems to prove the contrary, for the woman in Aristophanes (*Lysis.* 377) says, "If you happen to have the lye," (εἴ ῥύμμα τυγθνεις ἔχων,) "I will give you the bath." The perspiration was scraped off by an instrument like a blunt knife, called a strigil, much as the ostlers scrape the sweat from horses with an iron hoop. Xenophon (*Anab.* 1, 2, 10,) describes some of gold, which he calls στεγγλίδες. After further rubbing with towels the bather was invariably anointed all over the body with scented oils.

Much stress has been laid on a passage in the *Odyssey* (xv, 135,) where Pisistratus and Telemachus are so splendidly entertained by Menelaus, to shew that in that day there were separate bath rooms, but the passage seems to suppose the direct contrary; in fact it is curious how such a mistake could have arisen, as the heroes do not seem to have moved from the hall or dining-room. The words are, "Then indeed they sat down on couches and seats, and a maid-servant bearing a basin (χέρνιβα) poured from a ewer (προχοῷ) "beautiful, golden, upon a silver λέβης, that they might wash," she then places close to them "a smooth table," and then she brings bread and all sorts of food. In the *Equites* (1055) the Sausage-seller tells the Demus that the baths (πυέλους) in the bath house (βαλανείῳ) have been taken away, and the Demus cries out, "Then I shall go unwashed to-morrow." It is clear in this case a separate word is used for the bath and the place which contains it. See also the Etymolog. Mag. as before cited.

The origin of public baths among the Greeks is not clear, but it has been supposed with reason that private baths were first opened to friends at a small fee. That such existed is known from Plutarch (*Vita Demet. Poliorcet.*), where he states that Democles, for a particular reason, would go to none but a private bath; this must have occurred about twenty years before Pyrrhus of Epirus invaded Italy. The success of the experiment among friends probably led to the establishment of public baths.

ATHENÆUS relates (viii, p. 351) that in the town of Phaselis, they were in the habit of charging foreigners double for a bath, and he relates a story of a bath-keeper, who when his attendant attempted to overcharge a stranger, cried out, "Scoundrel, would you make me a Phaselitan for a little farthing," *παρὰ χαλκôυ μικορῦ*. In LUCIAN's time (Lexiphan.) the charge was but two oboli, and in the time of the Roman emperors, but a farthing, "quadrante lavari," is mentioned both by Juvenal and Horace.

There is but very scanty information respecting the construction of the Greek baths; ATHENÆUS (lib. viii, 501), however, states that they were covered by a *θόλος*, or dome, and they were probably, in other respects, much the same as at Pompeii, one of those places which we know Juvenal denounces as a "græcam urbem"; in fact not only did the Roman fashion resemble the Greek, but it is extremely probable that the whole system of bathing among the ancients is yet kept up in all its stages to the present day in Constantinople. The east has long been remarkable for steady adherence to every old habit and custom; and it may now be worth while to enquire what was done in the Roman bath, and how far this is paralleled by the Turkish Hummâm.

Although there is such scanty material for an architectural description of the baths of the early Greek period, there are very minute and circumstantial descriptions of those of the later period, beginning with that of VITRUVIUS, and proceeding with those of SENECA and PLINY, to the time of LUCIAN, a range probably of 150 years.

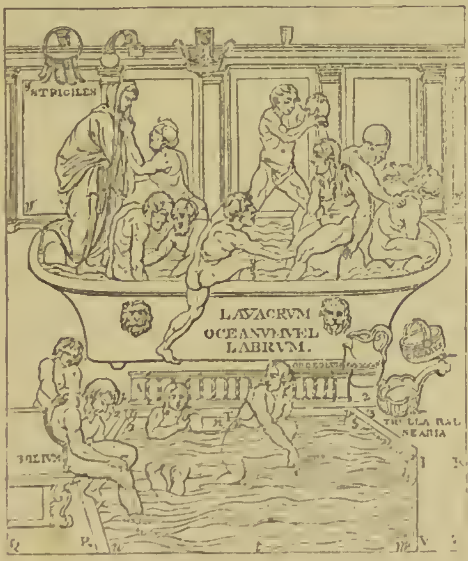
The first-named author, lib. v, cap. 10 and 11, has given rules for the construction of public baths in the Roman way, and of palæstræ, xysti, and baths in the Greek way. PLINY the younger has given some account of his own baths in two of his letters (ii, 17, v, 6). SENECA (cp. 86) gives a very curious description of the old villa and bath of Scipio Africanus. LUCIAN, in a separate treatise, "Ιππίας ἢ βαλανείον," describes some baths just erected by Hippias; these authorities are of course accessible to every one, and well known to the learned; so much only therefore will be extracted as will instruct without fatiguing the reader; the engineer's work will be then described, and it proposed to conclude with a very brief account of the remains of some of these noble works of antiquity.

Following the description of Greek work it is thought preferable to take the 11th chapter of the 5th book of VITRUVIUS before the 10th. He commences by saying, he intends to explain the Greek edifices, although they are not in use in Italy. In palæstræ, he says, square or oblong peristyles (courts or cloisters) should be made in circuit the length of two stadia—each stadium is the eighth of a Roman mile, consequently the circuit would be 1,203 ft. 6 in. English, and the court about 300 ft. square. On three sides the colonnades are to be single: these, he says, the Greeks call διαυλοὶ, but on the south side it is to be of double width with a double row of columns to keep out the dash, "aspergo", of the rain in the windy season. In the three single colonnades are to be species of pavilions (hexedræ) with seats, where philosophers, orators, and others, may sit and dispute. On the side of the double colonnade, in the middle, is to be a very large hexedra for the young men to exercise in, with seats. It is to be one third longer than its breadth; on its right side a "coriceum." (On this word there is much dispute, it will be treated of under its proper head, CORICEUM; it may suffice to express an opinion that it is a place for playing with the pilum, or ball sewed with leather. Under the seclusion in which the Greek women were kept, it is very unlikely the girls, *κουροι*, would be admitted in the very midst of the young men.) Next to this, the "conisterium," or place where the wrestlers were sprinkled with dust, that their adversary might not have a slippery hold. Next the "conisterium," in the turn of the colonnade "versurâ porticus", was the cold bath, which, says one author, the Greeks call λουτρὸν : on the left of the ephebæum (or young men's hexedra), the eleothesium, or anointing chamber of the young men, and next to that the cold elæothesium; from this passage we would suppose there was a difference between the ointments used after hot and cold bathing. From thence, one author says, there is a way into the propnigeum [literally choke-chamber] at the turn of the court; this was probably the stokery. Much difference of opinion has been expressed as to this word; it is difficult to conceive why a hypocaust or præfurnium should be supposed to be more "choking" than the hot "laconicum," but on looking a little closer into Vitruvius and the meaning he gives his words, in the account of the water machine (lib. x, cap. 13), it will be found that he employs a sort of check valve, or damper, in the form of an inverted funnel, and calls it pnigeus. The ETYM. MAGNUM, *Edit. Princeps, sub voce*, gives this curious passage "πνιγευς, among the comic writers a furnace, and it is also part of an hydraulic machine, and signifies the bridle; it comes from πνιγω, the second aorist is ἔπνιγον, from this is πνιγος, which signifies burning, or heat, and the word πνιγευς, which signifies a baking pan, and also the bridle for beasts yoked to a carriage." It appears highly probable that the πνιγεὺς was the *damper* to the furnaces, to *bridle* or increase the draft. If this be correct, no doubt "propnigeum" was the stokery. Next this, within the region of the frigidarium (not the frigida lavatio), is the concamerata sudatio, or vaulted sweating room; at one end of this is to be the laconicum, which will be treated of hereafter, opposite to this is the hot bath. Here is the sum of his description of the Greek ξυστὸς.

The Roman baths are described in cap. x. VITRUVIUS directs first, choose a site as warm as possible, averse from the north and north-east, because the hot and tepid baths should have their light from the south-west (occidente hyberno: literally, "winter sunset"); if there are any difficulties as to the site, then from the south, as the time for bathing is from noon to evening. Then it is to be contrived that the hot baths of the men and women should be contiguous, that the hot water vessels should easily be used in common by both. Let there be three brazen vessels (our author directs) joined together (componenda), one hot, another tepid, and so placed that as much water shall flow from the tepid into the hot vessel, as hot water shall go out. The like from the cold to the tepid vessel. Let the vaults of the "alveoli" be heated from one common fire; as already intimated; [all this work will be treated upon hereafter.] Let the "suspensuræ" of the cells [hollow floors under which were the furnaces] be thus made: first, let the ground be paved with 18 in. tiles, laid with a fall to the furnace, so that a ball, if thrown in, should not be able to remain, but must run back to the stoke hole, and so that the flame may circulate better under the "suspensuræ;" let pieces of eight inch bricks (laterculis bessalibus) he built so that two feet tiles may be bedded on them. The height of the piers to be two feet, to be built with potter's clay (argilla) and hair, and the two-foot tiles bedded thereon, to carry the pavement. It would be better if the structure were arched, but if there be framed tie beams "CONTIGNATIONES" (which see; and also TRABS, TIGNUM, &c.) let "SIGNINUM OPUS" (flooring composed of a concrete, made of pounded tiles and lime, something like Messrs. Fox and Barrett's principle) be placed under. Let iron rods or bows (arcus) be made, let them be suspended to the trusses, by crooked irons, as closely as they can. Let the rods or bows be so disposed that the tiles can lie and be carried in pairs, and so the whole vaulting be perfect: let the upper part of this chamber be lined with lime and hair; the lower part, which looks to the pavement, to be first trowelled with baked clay and lime, and then let it be polished with fine stuff (" albario," lime without sand, see PHILANDER in *loco*) or stucco (" tectorio," lime with sand). These chambers in the hot baths, if made double, will be the more useful, as the damp of the vapour will not injure the material of the roofing " contignatio," but will pass off between the two chambers.

" The sizes of the baths must be according to the number of bathers. Let them be thus made: the width the same as the length, less one third, exclusive of the ' schola of the labrum' (bath) and of the alveus. The labrum bath should be constructed under a light (window) so that those who stand round should not darken the light by their shadows. It is necessary that the whole of the baths should be spacious, as when the first shall have taken their places, the others looking on should stand properly. The alvei should not be less than six feet wide between the wall and the pluteus, so that the lower step and the seat (pulvinus) should take off thence two feet."

It will be better now to pause and examine this passage. That " labrum " is the bath, the πύελος of the age of Aristophanes, has already been explained, and of which there is no sort of doubt. The alveus has generally been considered to be the hollow part of the bath itself; but there seems this difficulty, if a seat and step of two feet are



to be taken off six feet, the bath could only be four feet long, and could never have held nine persons at once, as shown in Fig. 1, given by Mercuriali, *de Re Gymnas. apud Polen.*

Alveus has a great number of significations; from its primary meaning, the belly, it seems to have expressed any long flat hollow vessel—a trough or a tray, a back-gammon board *(duodecim scripta)* the hold of a ship, any trough-like hollow utensil or vessel.

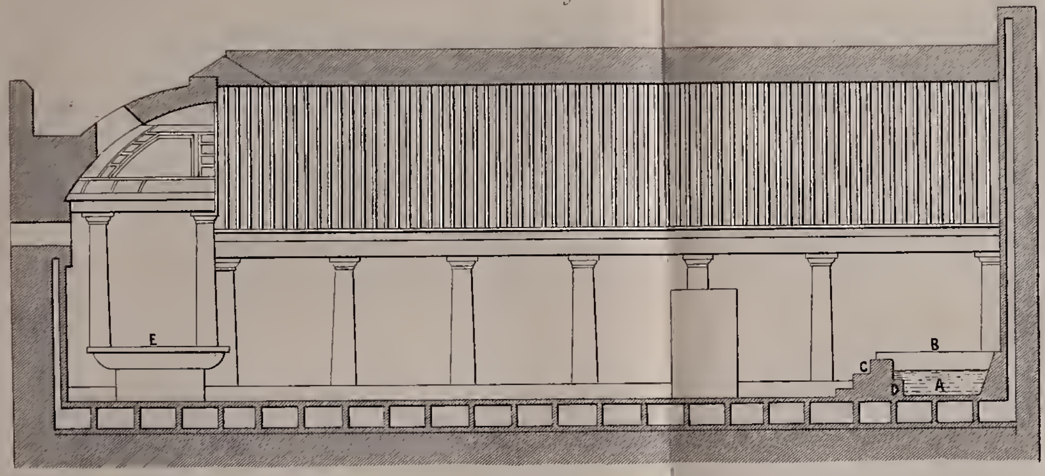
The section of the bath at Pompeii, as given by Sir Wm. Gell, is shewn Fig. 1, Plate ii. Former writers, and even some later ones, have suggested A as the alveus; while Marini and those who have followed him consider A to be the labrum, B the upper seat or spaces called scholæ (at Pompeii in the piscina are niches in the scholæ), C the pluteus, and D the solium, or inner seat. Now the labrum, marked E, Fig. 1, seems to have been a large laver, or πύελος, as shown also in Fig. 2, from the baths of Titus; and there seems no reason why the rim of the bath should be called a wall "pluteus." It is not necessary to pursue this criticism further, but to suggest that Pliny, Ep. lv. 6, calls the bath "puteus": if pluteus be considered therefore to be an error of the transcriber for the former word, the meaning of alveus is plain—it is the passage between the wall and the bath. This emendation, however, is thrown out with considerable diffidence.

The description of Vitruvius finishes thus: "Let the laconicum and sweating-baths be joined to the warm-bath, these should be as broad as they are high (measuring) to the lowest curvature (springing) of the hemisphere; let a light be left in the middle of the hemisphere, from which let a brazen shield hang by chains, by whose rise and lowering, the temperature of the sweating may be regulated. It should be made circular (*ad circinum*), that the force of the flame and vapour should

BATHS AND WASHHOUSES.

Plate 2.

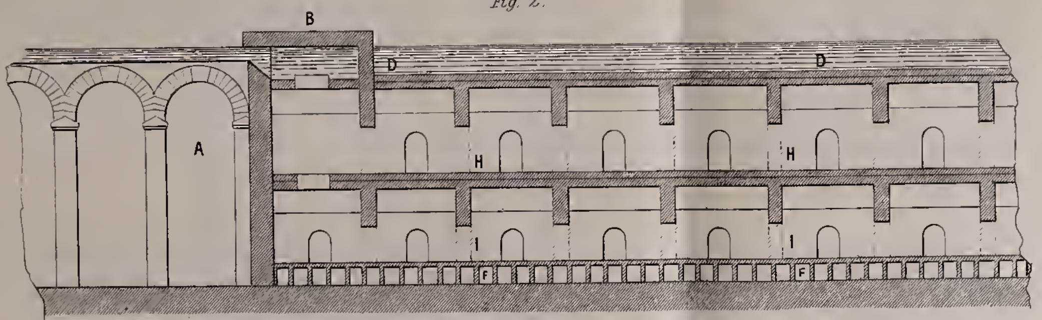
Fig 1.



SECTION OF THE CALDARIUM. POMPEII.

From Sir Wm. Gell's Pompeii

Fig. 2.



CASTELLA OF ANTONINUS

Fig 4.

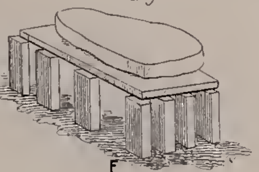


Fig 5

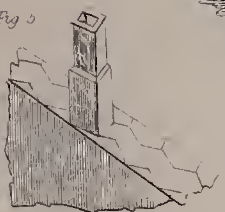
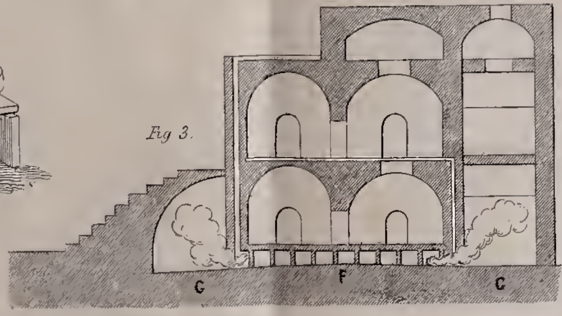


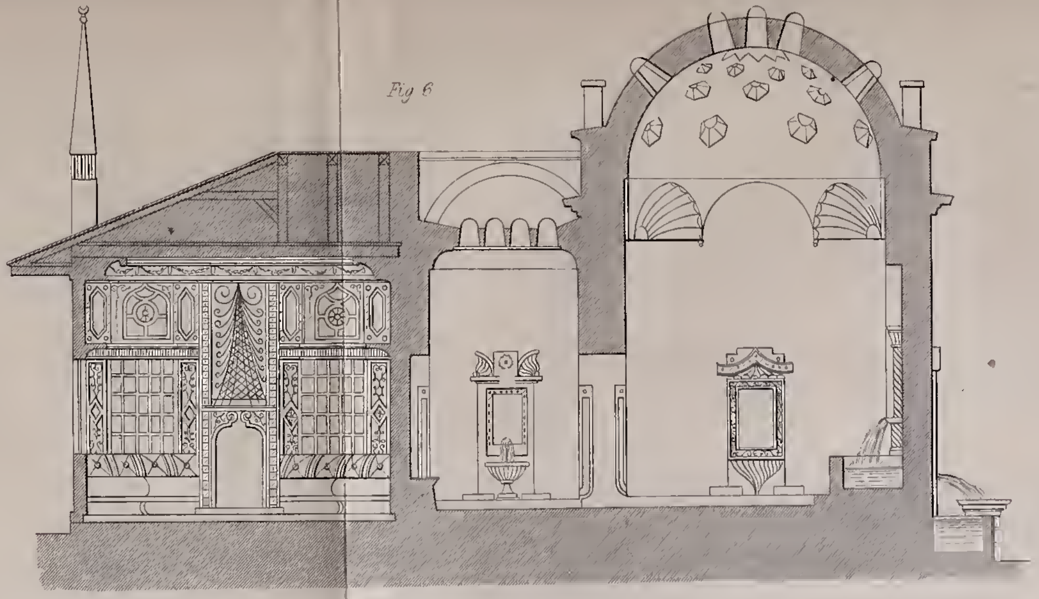
Fig 3.



SECTION AT B. FIG 2.

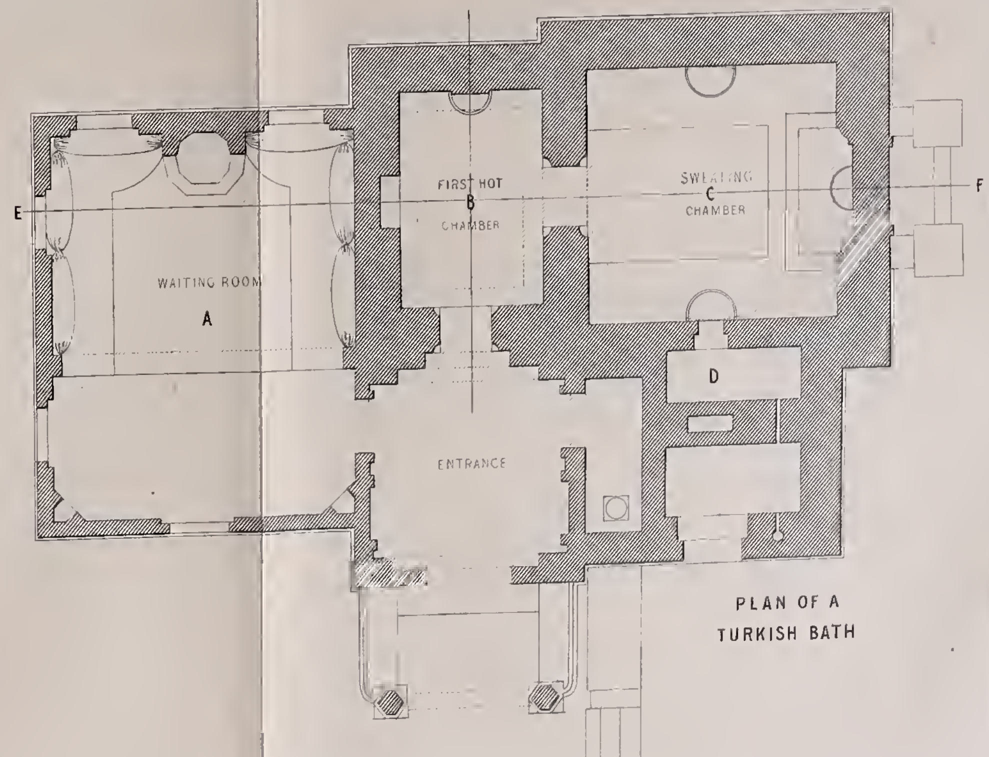
From Piranesi

Fig 6



SECTION ON LINE E F ON PLAN FIG. 7

Fig. 7



PLAN OF A TURKISH BATH

From Ramée

Ashpitel and Whichcord

Lithographed by Vincent Brooks 421 Oxford Street February 1st 1863

pervade equally from the middle by the roundness of the curvature."

These descriptions are given at greater length as the work of the great architect of antiquity: the others will be merely glanced at; that of PLINY (*Epist.* lib. v, 6,) gives a picturesque account of his Tuscan villa, at the foot of the Appenines: of course his bath was private. After describing the different parts of the house, he says: "There is then the winter cubiculum extremely warm, as it is filled with the full sun; attached is the hypocaust, and if the day be cloudy, its emitted vapour supplies the place of the sun. Then the apodyterium receives in its cold cell him relaxed and joyous from the bath. In this is a plunging bath (baptisterium) wide and deep. If you wish to swim at more ease and in warmer water, in the area there is a piscina, and in the next a puteus, if you would again be cleansed (abstergi may be read, rather than astringi) if you dislike the weather. He then states there are "cellæ frigidariæ," cold rooms, a "sphæristerium," or tennis-court over the apodyterium, and then he proceeds with an account of the rest of the villa. A description of his other villa at Laurentinum is given, lib. ii, 17. In the midst of the minute details of this villa is the mention of "cold-baths broad and spacious, on the opposite sides of which are two plunging-baths (baptisteria) in which you may swim if you wish. Next to this the anointing-room, and the hypocaust, and next to the bath the stokery (propnigeon) then a warm-bath, whence the swimmer may look on the sea. Next to this the tennis-court," etc. etc.

A most delightful description is given by SENECA, *Ep.* 86, of his visit to the bath of Scipio Africanus: he contrasts the little plain building belonging to the great hero with the luxurious baths of his day. The letter throws little light on the architecture. The mention of columns and statues would not be unexpected, but our readers will be surprised however to hear of inlaid gems, glass windows, and silver bath-cocks (epistomia) as early as about A.D. 50. The letter will amply repay a perusal, but is too long for these pages.

The description of the baths erected by Hippias, must not however be passed over quite so lightly. It is given by Lucian in a tract under that head. He commences by stating how few men there are, and how much they are to be commended, who shine in more than one art or science, and then praises Hippias as one who was at once celebrated as an orator, writer, mathematician, mechanician, musician, and architect. He then enters upon a long relation of the baths erected by him. After describing the difficulties of site and foundation, he says, "a large common hall (*οἶκος*) receives those who enter, fit for the footmen and servants to wait in; on the left are chambers fitted up for lounging (*ἐς τρυφὴν*). These, he says, are excellently fitted up with plenty of light near the baths, and suitable for the genteeler (*ευδαιμονεστέρων*) people [in fact first-class waiting-rooms]. After these, and beneath, are sufficient receptacles for taking off clothes, *διαρκεῖς τοῖς ἀποδυομένοις ἀποθέσεις* (dressing boxes). A middle hall of great height, superbly lighted, holds three swimming-baths (*κολυμβήθρας*) of cold water, adorned with Lacænian marble. In this are two antique statues of white marble—Health and Esculapius. Entering thence, a hall, gradually warmer, receives you with a not unpleasant heat, of long form, and arched throughout. Then, on the right, is a hall containing every variety of ointments, having entrances below ornamented with Phrygian marble leading to the palæstra. Then another hall, the most elegant of all, fitted to stand or sit in, to wait a long time or to 'roll oneself about in' (*ἐγκυλισασθαι*) of polished Phrygian marble to the very top.

"Within is the hot-bath (*θερμὸς*) of Nomad-stone. Inside of which is a beautiful hall, full of light, and as it were flowered with purple. In this are three hot-baths (πυέλους).

"There is no need to return by the other halls, but directly by the cold room (or bath) ψυχρὸν, through the gently warm (tepid) bath (ἠρέμα θερμοῦ)"—LUCIAN then goes on to describe, in general terms, the light and beautiful appearance of the building, but on this and his conclusion there is no occasion to dwell.

Some readers might think an apology necessary before the next and last classic authority is introduced. It is from the *Oneirocritica* of ARTEMIDORUS, of Daldis—the Dream-book of the ancients. No Seven Dials catch-penny, with a gaudy frontispiece, pourtraying a gentleman in an intensely blue coat, and a lady in all the colours of the rainbow, extending their palms to an old woman in a red cloak, but a grave serious quarto, in very good Greek, of the age of the Antonines. The passage is, however, very curious, and as it is doubted that it has ever been submitted to the English reader, a portion is here abstracted. "To dream," says the author, "of bathing was formerly not considered to be bad—for they knew nothing of baths, but they washed in ἀσαμίνθοις. In later times it was judged bad to dream of baths, even of seeing them; for men generally bathe after labour, and especially after returning from the wars. But now-a-days the bath is nothing but the introduction to good cheer—ἡ ὁδὸς ἐπὶ τροφὴν—and therefore to dream of beautiful and clear baths, and genial warmth, is a sign of wealth and prosperity, it also signifies health to the rich. To dream of bathing in an unusual manner is bad, as to dream of entering the θέρμαι with one's clothes on." He then relates a story of a lute player, who was hissed off the stage after dreaming he was in a bath without water. "It is good," he says, "to dream of bathing in rivers and pure springs, but not to swim—this signifies danger and disease. To dream of the strigils and instruments for cleansing the skin (*στεγγίδες τε ξύσται καὶ καταμάγεια*) signifies servants. He who dreams of losing his strigil will lose a slave." This might be interesting on the other side of the Atlantic. "The oil-flask (*λήκυθος*) and the strigil-case (*ξυστροφύλαξ*)," he says, "signify your wife's slave, or a faithful maid-servant."

It appears from the foregoing that in the later times, there were two sorts of bathing, the cold and the warm. This treatise, of course, is of baths, rather than bathing, and it is desirable to describe no more of one than will illustrate the other, and make the treatise intelligible.

The parts of the cold baths seem simply to have been, first, the apodyteria, or dressing rooms. It is singular that Vitruvius, with all his minuteness, does not mention this; while Lucian calls them *αποθέσεις*, or in common English, drawers, boxes, or literally, "put-away" places. It is possible they were not rooms, but enclosures, like our dressing boxes. At Pompeii, the frigidarium seems to have served as the apodyterium. The clothes were taken, some authors say, by servants, called "capsarii," because they put them in "capsæ" (see the *Digest.* i, 15, 8, where the theft of clothes is made a capital crime); others call them "caprarii," because the garments were hung up on hooks of horn. That this seems an invariable practice we learn from Cicero's speech in defence of M. Cœlius Rufus, charged by the notorious Clodia Quadrantaria (the Lucrezia Borgia of the day) with an attempt at poison. The drug, this female Titus Oates swore, was to have been conveyed in a box by a young man named Licinius, and given to Cœlius in the bath. Cicero shows how unlikely and improbable a story this is, as there was no means of concealment of a box when the parties were undressed, and that if "shod" and dressed "calceati et vestiti," they would not have been admitted. That the dresses were left in the same way on the woman's side is learnt from Ovid (*de Arte Amand.* iii, 639).

Next was the plunging, or swimming bath, called *λουτρὸν, κολυμβήθρα, βαπτιστήριον*, piscina, puteus, natatio, natatorium, &c. At Pompeii this is circular, about 13 feet in diameter and 3 feet deep, with scholæ or vacant spaces, and niches round it. That the Romans used to swim in these, there is proof in the often cited observation of Cicero to his brother Quinctus, where he wishes for a wider piscina that he might not hurt his hands when he flings them out. After this, it is surmised, came the cold anointing chamber, the "elæothesium frigidarium" of VITRUVIUS, and this seems to have completed the cold bathing. They who used the hot baths also commenced by undressing, either in the apodyterium or the frigidarium.

It is not desirable to enter into the different methods of bathing as recommended by the two great doctors of antiquity, Galen and Celsus; suffice it to say, like other doctors, they differ: the first recommends, to commence with the hot air of the laconicum, then the warm bath, then the cold; while the latter recommends, first, the tepidarium, then the caldarium (which includes the laconicum), then the frigidarium. While in the laconicum, the perspiration was scraped off by the strigil, and a sort of shampooing took place. The anointing is beside the present purpose; those who wish to know more of the unguents of the ancients, should consult that wonderful and amusing collection of all the scraps and *omnium-gatherum* of antiquity, the *Deipnosophists* of ATHENÆUS.

Perhaps most light will be thrown on the subject by a comparison with the modern Turkish bath. As it will be necessary to make some allusion to these before the conclusion of this treatise, the highly graphic description of the celebrated Mr. Michael Angelo Titmarsh is at once extracted. This ingenious gentleman writes from Constantinople, thus:—

"I made the dragoman conduct me to one of the best appointed hummâms in the neighbourhood, and we walked to a house at Tophana, and into a spacious hall lighted from above, and which is the cooling room of the bath [the frigidarium of Vitruvius]. This spacious hall [the οικὸς of Lucian] has a large fountain in the midst, a painted gallery running round it, and many ropes stretched from one gallery to another, with profuse draperies of towels, and blue cloths for the use of the frequenters of the baths. All round the room and the galleries were matted enclosures, fitted with numerous neat beds and cushions for reposing on, where lay a dozen of true believers smoking or sleeping, or in the happy dozing state. I was led up to one of these beds to rather a retired corner, in consideration of my modesty; and to the next bed presently came a dancing dervish, who forthwith began to prepare for the bath.

"When the dancing dervish had taken off his yellow sugar-loaf cap, his gown, shawl, &c., he was arrayed in two large blue cloths [probably περιζωματα] a white one being thrown over his shoulders, and another, in the shape of a turban, plaited neatly round his head. The garments of which he divested himself were folded up in another linen and neatly put by. I beg leave to state I was treated in precisely the same manner as the dancing dervish. [If the αποδυτηρια be considered to be the same as the αποθεσεις of Lucian, the above is an exact description of the ancient bath; if the apodyterium was a separate hall or room, it would certainly have been so described by Vitruvius].

"The reverend gentleman then put on a pair of wooden pattens [soleæ; Spartianus calls one of the chambers in the baths of Caracalla, 'cella solearis'] which elevated him about six inches from the ground, and walked down stairs and paddled across the moist marble floor of the hall, and in at a little door, by the which also Titmarsh entered. But I had none of the professional agility of the dancing dervish; I staggered about very ludicrously upon the high wooden pattens, and should have been down on my nose several times, had not the dragoman and the master of the baths supported me down the stairs and across the hall. Dressed in three large cotton napkins, with a white turban round my head, I thought of Pall Mall, with a sort of despair. I passed the little door; it was closed behind me; I was in the dark; I couldn't speak the language; in a white turban, mon Dieu! what was going to happen.

"The dark room was the tepidarium, a moist, dark, oozing, arched den, with a light faintly streaming from an orifice in the domed ceiling———

"When you get into the sudarium, or hot room [the laconicum and caldarium], your first sensations occur about half a minute after entrance, when you feel that you are choking [see the description of this apartment by Lucian, in the Hippias, given above]. I found myself in that state, seated on a marble slab; the bath man was gone; he had taken away the cotton turban, and shoulder shawl; I saw I was in a narrow room of marble with a vaulted roof, and a fountain of warm and cold water: the atmosphere was in a steam, the choking sensation went off, and I felt a sort of pleasure presently in a soft boiling simmer, which, no doubt, potatoes feel when they are steaming. You are left in this state about ten minutes; it is warm, certainly, but odd and pleasant, and disposes the mind to reverie.

"But let any delicate mind in Baker-street fancy my horror, when, on looking up out of this reverie, I saw a great brown wretch extended before me, only half dressed, standing on pattens, and, exaggerated by them and the steam until he looked like an ogre, grinning in the most horrible way, and waving his arm, on which was a horse-hair glove———

"The grinning man belabours the patient violently with the horse brush. When he has completed the horse-hair part, and you lie expiring under a squirting fountain of warm water, and fancying all is done, he re-appears with a large brass basin, containing a quantity of lather, in the midst of which is something like old Miss Mac-Whirter's wig, that she is so proud of, and that we have all laughed at. Just as you are going to remonstrate, the thing like the wig is dashed into your face and eyes, covered with soap, and for five minutes you are drowned in lather; you can't see, the suds are frothing over your eyeballs; you can't hear, the soap is whizzing in your ears; you can't gasp for breath, Miss Mac-Whirter's wig is down your throat, with half a pailful of suds, in an instant you are all soap; wicked children in former days have jeered you, exclaiming, 'How are you off for soap?' You little knew what saponacity was till you entered a Turkish bath——[The same operation is described by Savary, one of Bonaparte's savans in Egypt; curiously enough, he says, they called the soap *rusma,* evidently a corruption of *ῥυμμα,* of which mention was made before].

"When the whole operation is concluded, you are led—with what heartfelt joy I need not say—softly back to the cooling-room [this explains the use and name of the *ψυχρον,* or frigidarium], having been robed in shawls and turbans as before. You are laid gently on the reposing bed; a cool sweet dreamy languor takes possession of the purified frame, and half an hour of such delicious laziness is spent, as is unknown in Europe."

There is no apology needed for quoting at such length this brilliant little description, feeling that it illustrates the subject both of ancient and modern baths so well, and besides (a thing it is hoped ever before one's eyes) it saves space, and the reader's patience.

It is now proposed to turn to what in these times is called the *engineering department.* Like everything else the Romans did, this was carried out in a far more vast and striking manner than would be at first supposed. It is now found difficult, even with best Low-moor plate boilers, and all the appliances of modern science, to keep baths going for one hundred persons. Conceive then what it must have been in the baths of Diocletian, where 1,800 persons were accommodated at once. Let the mind be made up to listen to something out of the way, and be told that all this mass of water was boiled in brick chambers, put together with lime and hair, and lined with tiles bedded in the same; that there are the remains of a set of these chambers, twenty-eight in number, below (or as a ground story), covered with twenty-eight other chambers as a sort of first story, and containing two millions and a quarter cubic feet, or nearly fourteen million gallons, all heated by one furnace forming a basement; that such a building would actually cover more ground than Exeter Cathedral, and would hold as much water as that entire building, transepts included, if filled to within nine feet of the ridge rib of the groining, and that this mass of water was boiled without apparent difficulty; an idea of the Castella of Antoninus can then be imagined, and also some faint idea formed of Roman engineering. What are the dye or print works of the present age to this? The boiler power at the largest foundries or factories, is a plaything to it. This interesting subject will be now entered into at more length.

The furnaces have been carefully described in the above cited passage from Vitruvius, and seem to have been constructed so as to be best adapted for burning wood. The ash is a simple alkaline powder (the *κονία* of the Greeks, of immense value to the ancients, as the method of separating soda or potash from chlorine was unknown), a powder which could easily be swept away by a broom, unlike the soot from coals: no fire bars, or bridges were wanting; a simple paved floor with a slight incline to give a draught, was all that was necessary. In fact it was like the bottom of a country oven. But, how simple piers of brick in pottery clay and hair, and simple tiles, and a sort of trowelled concrete floor on this, could bear at once the vast heat of the fire, a weight of water of many tons to the foot, and the expansive power of the boiling fluid, besides the wear and tear of constant flame, is wonderful indeed. However, there are the Roman hypocausts to this day, and the united labours of PIRANESI, and of CAMERON (*Baths of the Ancients*, fol. London, 1772), have proved to demonstration this is no fable.

Of course these are the suspensuræ of VITRUVIUS. At Pompeii, instead of 8in. square piers 2ft. high, they are 9in. square and only 1ft. 7in. high. They support strong tiles 15in. square, on these is the *signinum opus*, or Fox and Barrett concrete, and then where they are visible, as in the laconicum, a mosaic pavement is bedded upon it. Every wall and every pavement was perforated by square earthen tubes, Plate II, Fig. 5, fitting into each other, through which the flame and smoke circulated and afforded as much heated surface as possible. See also the detail from the Baths at Augusta Rauracorum, Fig. 1, Plate III. The invention of the suspensuræ has been attributed to the Sybarites; be that as it may, it was evidently new in the time of SENECA. That author (Ep. 90) speaks with wonder of the things discovered in his memory, as window panes made of talc; the *suspensuræ* of the baths; and "tubes impressed within the walls", through which heat might circulate equally above and below; contrivances to cut and polish marble, and to erect porticoes and arches; and lastly, the invention of marks for words, "by which an uttered speech might be seized, and the hand follow the celerity of the tongue." If the good philosopher marvelled

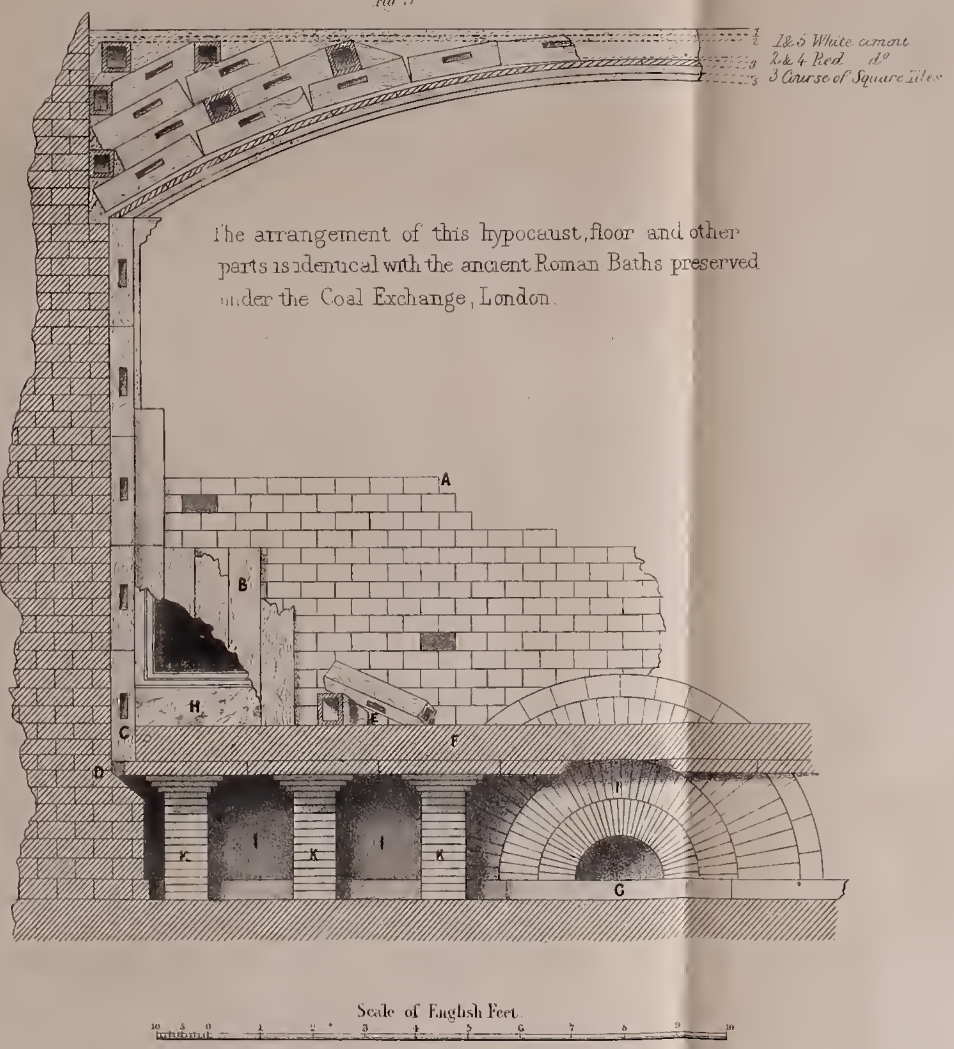
BATHS AND WASHHOUSES.
Plate 3.

SECTION OF THE HYPOCAUST AND OF ONE OF THE CHAMBERS OF THE ANCIENT ROMAN BATHS AT AUGST_BASLE, (AUGUSTA RAURACORUM)

shewing the construction of the floors, walls, vaultings &c from a drawing in the possession of Professor Donaldson, copied from the original one by Monsr. Aubert Parent, French Archt. made on the spot in 1803.

A	*Solid construction of the walls*	**F**	*Floor formed of cement &c*
B	*Hollowed bricks attached to face of walls*	**G**	*Opening of the furnace*
C	*Section of bricks on walls with holes for current of warm air*	**H**	*Plastering coating laid on the hollowed bricks and decorated with paintings*
D	*Passage for communication of hot air from hypocaust up into the hollowed bricks*	**I**	*The Hypocaust*
E	*Detached hollow bricks.*	**K**	*Square brick piers with cappings surmounted by large square tiles or bricks to receive the cement floor*

Fig 3



The arrangement of this hypocaust, floor and other parts is identical with the ancient Roman Baths preserved under the Coal Exchange, London.

Fig 1

PLAN OF A BATH FOR MEN AND WOMEN AT BERGAMO. _ ASIA MINOR.

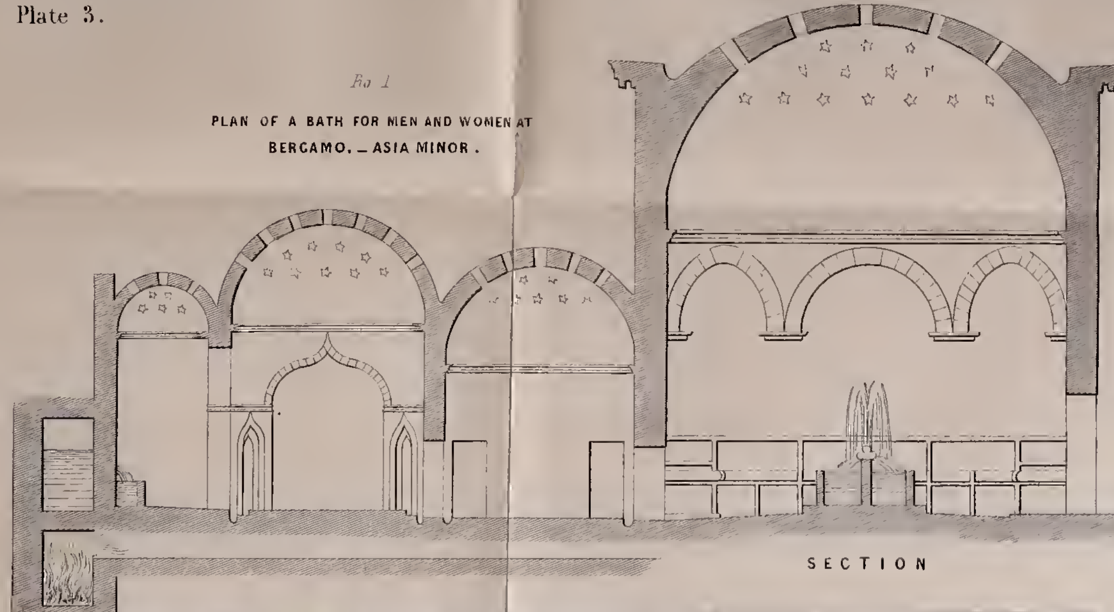
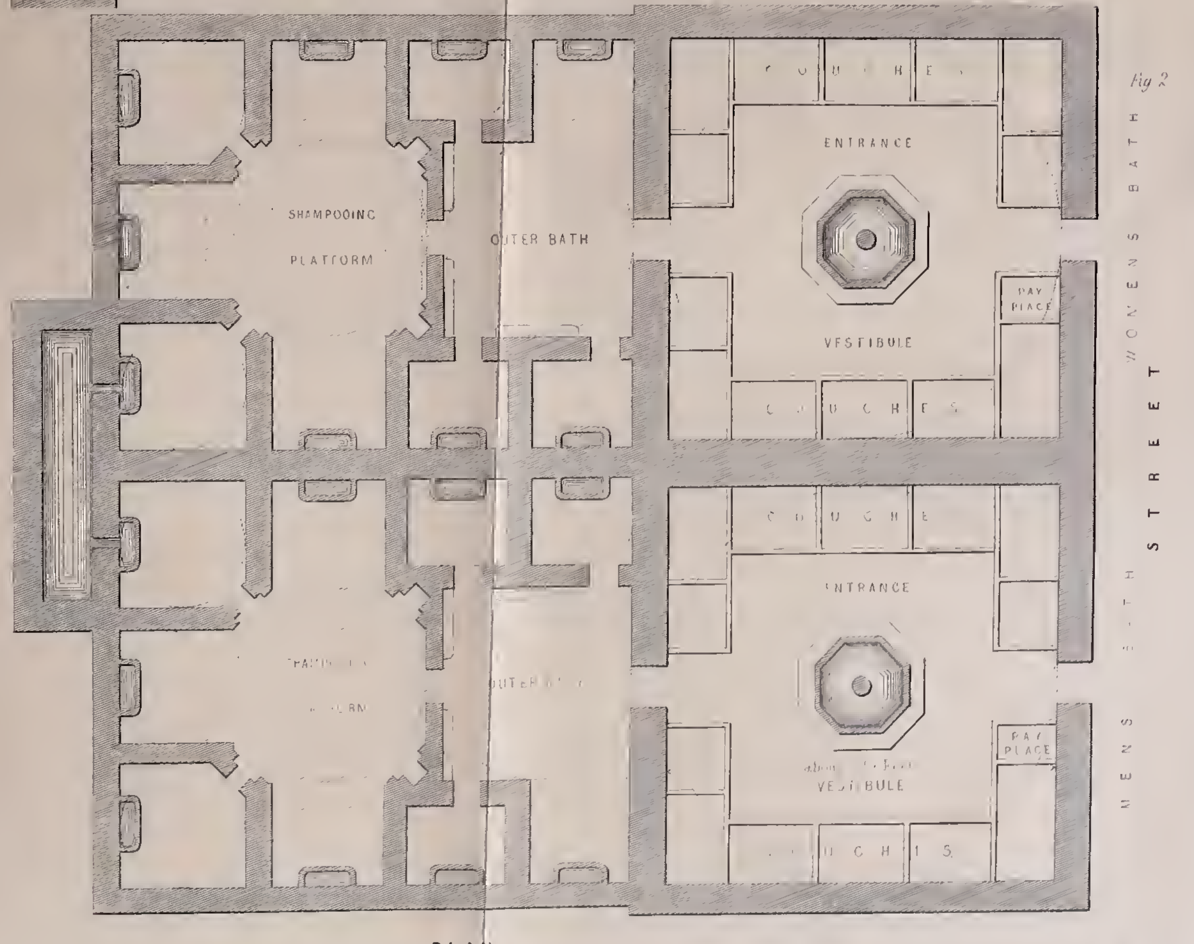


Fig 2



Measured and Drawn [illegible]

Lithographed by Vincent Brooks [illegible] Feb. 1st 1853

so at short hand, what would he have thought of the electric telegraph?

The English antiquary must beware of an error into which too many persons have fallen, namely, that of calling every Roman remain *a Bath*, where a hypocaust has been discovered. Most of those found in this country were intended to warm the dwelling rooms, and supply the want of an Italian climate in houses which strictly followed the Roman model. The small "foculus" or brazier, with which the Romans were accustomed to ward off the little winter they got in their own climate, would have been useless in the rigorous winters of a wooded country, where every stream was ice-locked during the winter months. Fancy the looks of some gay-plumed young Centurion, accustomed to lounge along the Via Sacra, or complaining of the horrid algid cold as soon as a little snow fell on the extreme top of Soracte, when his face had to encounter the north-east winds of the hills of Yorkshire—or still worse of the Grampians. No wonder they gladly resorted to the invention of the Sybarites, and that almost every Roman building in England has its hypocaust, in some form or other.

The laconicum seems to have had the usual hypocaust under the floor, and a false lining round the whole room, behind which the heat circulated, like the gallery flues of a boiler. This false lining was formed in a very curious way, of large square tiles, fixed by metal cramps at each corner. It appears that while the tiles were moist, a sort of plug was thrust through in several places, forcing out the clay like a tube, and forming a kind of short pipe on the back of the tile. Through these the cramps passed, and of course the length of the tube regulated the distance from the wall, and the space for the heat to circulate in. A quantity of pitch was found in the stokeries at Pompeii; whether intended to light the fires, or to give an occasional extra impetus to the flame, is not known.

Now that the laconicum is being treated of, it is preferable to revert to the description of the clypeus or shield, as given by Vitruvius. Much conjecture has been bestowed on this subject, but it seems clear enough. Besides the heat of the hypocaust, a painting in the baths of Titus (Fig. 2), shows that a fire was actually kindled in the laconicum. This seems to have been enclosed in some hemispherical metal vessel. Within this is drawn a second, suspended from the first by chains, exactly as described by Vitruvius, and it is easy to see how this second vessel (marked clipeus) could be raised or lowered, and would act as a sort of damper, extinguisher, or large curfew (couvre-feu) on the fire. Probably water was sprinkled on the outer metal vessel to temper the dry heat of the place. Far be it that these individual remarks should be placed against those of more learned authorities, but there is such strong professional bias in favour of a drawing or a diagram, and the matter seems such common sense, that the wonder is, there has been so much discussion about it.

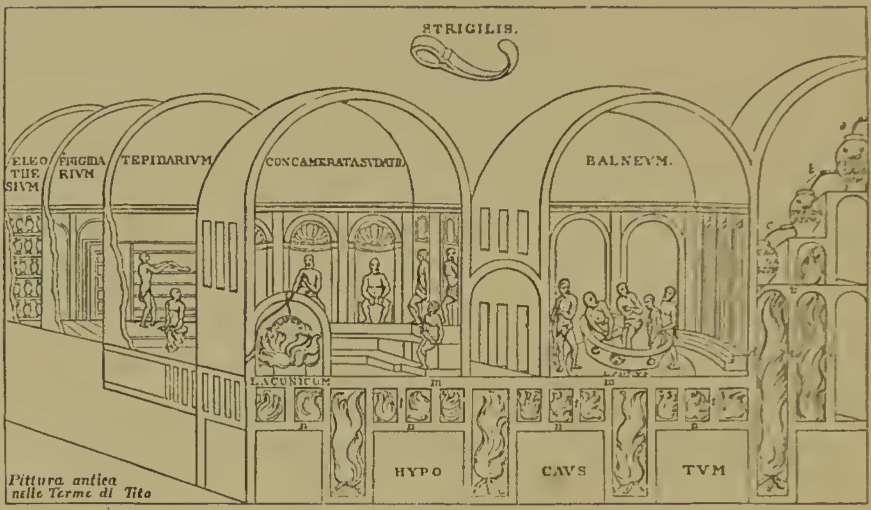


Fig. 2.

Let the subject of heating the water be now returned to;

again reverting to the description of VITRUVIUS *(vide supra)*. He distinctly describes three vessels joined (componenda) in some way, one boiling, one tepid, and one cold, and so placed in conjunction (collocanda) that as much water should flow from the tepid into the boiling vessel as should be drawn out, and the like from the cold into the tepid. An infinity of labour has been bestowed on this passage, some critics have placed these coppers (æneа) side by side, and supposed that one filled the other by a syphon, some have drawn them as a little above each other, and the water running in an ordinary way from service cocks. Others have placed them one on the top of the other, almost like the old chemical Nooth's apparatus. The second is the way in which they are drawn in the picture, found in the baths of Titus (Fig. 2), and which being a clear diagram ought to have every consideration. But there is this practical dilemma,—if the water passed from one vessel into the other by mere service cocks, how could the middle vessel become tepid? There must have been a connection between it and the boiling vessels, or no heat whatever could pass, and if there was a connection so that the hot water could circulate, the hotter fluid would naturally rise, the highest vessel would contain the boiling water instead of the lowest, and the lowest would be the tepid vessel. With a rapid circulation it might become something more, but certainly could not be the hottest.

If the section of the castella, as given by PIRANESI (Plate II, Fig. 2 and 3), be referred to, A will be found to be the main service of water from the great aqueduct; B, a sort of cistern or filter, with probably a grating to catch leaves, etc.; D, a huge open shallow cistern wherein the water was exposed to the sun, and partly heated thereby: this was the roof or top of the upper set of twenty-eight chambers described before, each chamber being 49ft. 6in. by 27ft. 6in, and 30ft. high, all vaulted over, and lined with tiles and opus signinum; F, the hypocaust; GG, the furnace mouths; H, the upper set of chambers; I, the lower set. Fig. 5 shows the pipes, the tubi impressi, in the walls; and Fig. 4, the suspensuræ, all of which have been before described. Now it is clear that D represents the æneum frigidum of VITRUVIUS, H, the tepid vessel, and I, the boiling vessel. There are many ways in which the supply from one to the other could be regulated. The simplest would be a clack-valve, and a balanced float. It is not known whether the Romans were acquainted with the ball-cock, but as they knew the bibb-cock or epistomium, this could easily be imagined. Now, as before stated, if there was a constant communication between the two chambers, a circulation would take place and both would boil. The difficulty appears to be easiest explained thus: whatever was the position of the vessels, the steam only, generated by the boiling vessel, was conveyed into the second vessel, and became gradually condensed there by the cold water, just as when a locomotive stands still, the driver turns his waste steam into the water tank, and gets it partially hot, so that steam may be more quickly generated in the tubes, than it would be, were quite cold water injected into them.

A series of plans will be now described of existing Roman baths, beginning at the smallest known example, and proceeding to the magnificent erections of the emperors.

Fig. 3 is from a villa on the supposed site of the ancient Stabiæ, a little beyond Pompeii. A, the præfurnium or stokery; B, the frigidarium; C, the tepidarium; and D, the laconicum, with its double walls.

Fig. 4 is from the same neighbourhood, but of larger size. A, the præfurnium; B, the frigidarium; C, the tepidarium, of much greater extent; D, the laconicum, of exactly the same plan as the last; but in addition to these, there is E, the piscina, or cold swimming bath: it has niches, or scholæ, like that of the

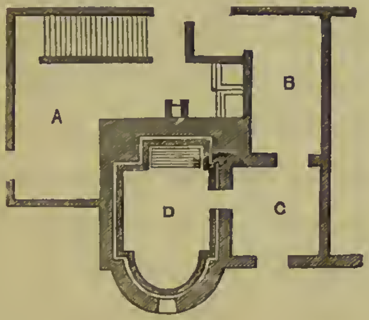


Fig. 3.

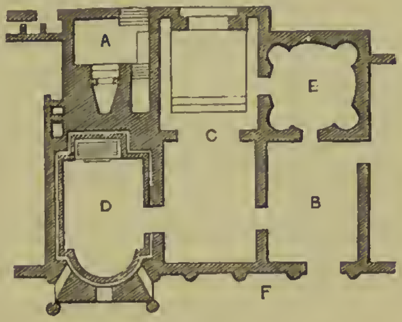


Fig. 4.

large baths at Pompeii (Plate I, Fig. 2, C); F, part of the atrium of the villa, or colonnade leading to the baths.

The pile of buildings forming the example of baths from Pompeii (Plate I, Fig. 2), fills up the whole space between four avenues, and forms an entire insula, as was usual, and is now so in Italy. The lower portion of the frontage, and perhaps a small mezzanine or room over, were let off as shops. At A, the water service entered, coming from a piscina or cistern, at the other side of the street. 1 appears to have been the stokery; 2, the furnaces themselves; 3, the court for stowing fuel, and for the general use of the engineer; here, as was said before, a quantity of pitch was found; the stairs shown, led, some up to the boiling vessels, others down to the furnaces. The men's baths had three entrances, 4, 5, and 6; the principal was the latter, and led to the waiting-room 7, passing through the open court or atrium 8; the entrance 5 also led to the same court. 7 was surrounded by seats, probably for the servants in waiting, and in it was found the box of the money-taker, and a sword, probably also belonging to this functionary. Passing through the different corridors, as the entrances directed, the bather came to the apodyterium or dressing-room, B. In the corridor marked 4, no less than 500 lamps were found—for what purpose placed there it is impossible to say—the ceiling was decorated with stars, like some gothic chancels. The apodyterium had seats of lava, with foot-stools, and the holes where the pegs were fixed, on which the dresses hung, are plainly visible. A small closet, 9, probably contained the valuables left by the bathers. This room, SIR W. GELL, with great probability, supposed to have been not only the apodyterium, but the frigidarium or cooling-room. This is the more probable, as it leads into the other rooms, just as in the smaller instances. C was no doubt the piscina, frigida natatio, or plunge bath; the niches round were no doubt the scholæ. The bath is 12ft. 10in. in diameter, and 2ft. 9in. deep, entirely of white marble; the supply was a bronze mouth, and at bottom was a small waste to cleanse it out, an overflow waste was placed at the edge. D is the tepidarium, a very handsome vaulted chamber, enriched throughout; the springing of the arch of the ceiling being supported by Telamones, or powerful human figures. In this room were some seats, and a brazier of bronze, showing, that in very cold weather some additional heat was required to render the temperature tolerable. E was the calidarium, containing at one end, as has been shown by the large section (Plate II, Fig. 1), the labrum, and at the other the alveus, puteus, etc. This has already been so fully described that it need not be repeated.

The entrance to the women's baths seems to have been at 10. F appears to have served both as apodyterium and frigidarium: it contains a cold bath, and also accommodation for ten persons to dress or undress. G appears to have been their tepidarium; it is a room about 20ft. square; while H is the caldarium, containing the labrum and a hot bath, 11, close to the furnace like those of the men. The women's baths have suffered much more from the hand of time than those of the men. It would not have served any purpose to enter into the details of the architectural decoration, but only to convey such general ideas of the plans as would illustrate the previous descriptions.

The ground plan of the splendid baths of Diocletian (Plate I, Fig. 1), like all these later edifices, comprehended not only baths, as described by VITRUVIUS, but palæstræ, hexedræ, a stadium, libraries, and even a theatre. This illustration is given as one of the best arranged plans of the kind. The main buildings are situate in the midst of a quadrangle. A, entrance hall (stated by CAMERON, but he does not say on what authority, to be the bath-room of the athletæ); B, the waiting-room, undressing-room or apodyterium; C, the xystus, with margins, that the bystanders might witness the games, and yet be out of the way; D, a large atrium, with a piscina, or swimming-bath in the centre; E E, vestibules leading into F F, tablina, and thence into G G, the cold baths, *frigida lavatio;* H H, the conisterium, or place for anointing and sprinkling with sand; I I, ephæbæum, or place for exercise for the younger men; K K, elæothesium; L L, frigidarium; M M, tepidarium; N N, caldarium; O O, laconicum; P P, detached circular buildings, supposed to have been small temples; Q Q, libraries; R R, atria to ditto; S S, back entrances, probably to the theatre; T T, rooms attached to the xystus; U U, rooms said to be intended for the athletæ; W W, two peristyles with swimming-baths in the centre; X X, Y Y, Z Z, detached baths, apodyteria, and elæothesia, said to be for the use of the philosophers, or for other distinguished persons; *a a,* bath keeper's apartments; *b b,* schools; *c c,* the stadium; *d d,* the theatre, *i. e.* the spaces for steps to the seats.

With the advance of Christianity the system of public baths seems to have declined; some have supposed it to be intended to mark the difference between Pagan luxury and Christian simplicity: this can scarcely be agreed to; but it is no doubt true that during the entire mediæval period there is no record of anything like large public bathing establishments in Europe. That bathing, however, was extensively used, and its practice peculiarly respected, is found from numberless instances. The strongest perhaps is the circumstance of the ceremonial of bathing previous to conferring the order of knighthood on those who, during the middle ages, had merited this honoured distinction. The great SELDEN himself, in his *Titles of Honour*, has not been able to unravel the mystery: certain however it is, that the order of the Bath is the second among the exalted ranks of knighthood in our own land. A foreign writer has fancied that the lavatorium attached to monastic buildings had something to do with bathing, but an inspection of the existing cloister would show it was a mere place for washing hands.

The Russians have now, and have had for centuries, a species of laconicum or sweating bath, the heat being produced by scattering water on red hot stones; but as these buildings are mere wooden sheds, it would be useless for the object of the present purpose to dwell on them. The Indians of America have similar baths constructed of wicker and covered with skins. In these they make a sort of sweating bath, not unlike the description given by HERODOTUS of those of the Scythians, with which nation the North American Indians have many points in common.

There are many public baths in Europe, and some of them splendid buildings; but as bathing seems the last thing thought of by the proprietors, and as the magnificent edifices at Wiesbaden and Carlsruhe, at Bath and Cheltenham, seem decidedly planned for music and promenades, and in some instances even as salons for gamesters, they are also as much beside the purpose as the rude examples above quoted.

The only modern instances of public buildings purely devoted to these purposes are the hummâms of the Orientals.

Their similarity to those of the Romans has been already dwelt upon, and much more cannot be added to the graphic description before cited of Mr. M. A. Titmarsh. A plan and section (Plate II, Figs. 6 and 7) is given of one, from the celebrated architect Ramée. A, the divan, waiting-room, or frigidarium, and sometimes serving also as the apodyterium, or dressing-room; B, the tepidarium, or first warm chamber; C, the caldarium, or sweating chamber; and D, the place in which the bather gets the thorough ablution of soap as before described; this room probably answers to the labrum of the ancients. These buildings have another point in common with those of Rome. The bath-rooms are almost invariably vaulted or domed; the light descends by small polygonal apertures, and produces the most singular and picturesque effects as it breaks through the volumes of rising steam upon the scene below, and tinges the shaven crowns and bushy beards of the believers in Mahomet. Figs. 2 and 3, Plate III, are a plan and section, being an interesting example of a double bath for men and women.

There is but little reason to doubt that the cause of the disuse of public baths for long years back has been just the reason why they are now re-established. The question turns wholly on the density or scantiness of the population. Devastated as all Europe was after the inroads of the northern nations, few and scattered as was their population, the necessity for such establishments did not exist. The bather could without difficulty resort to the clear pool or bright river, and as it is in crowded assemblies the need of artificial ventilation is felt, so it is in an increasing population the need of readier methods of purification must be resorted to. And this commences the second portion of the task here undertaken.

BATHS (MODERN) AND WASHHOUSES.

Requirements arising in society very slowly and gradually, and which do not depend on any great fact or marked event, are always the most difficult to understand and the latest to find a cure.

As society is now constituted, it is too often the case that evils of this description are first detected by the eye of some pretender, who has a nostrum to propound for every disorder, who exaggerates every evil for the purpose of exalting his own self and his own remedies. The frequent repetition of this system has caused the public to be cautious in listening to complaint, and suspicious of receiving remedial suggestions.

The charlatan is without doubt one of the greatest causes of "obstruction", as it has been called, in the present day, and perhaps in no instance is this more signally evident than in all matters which the vast increase of our population has affected.

Day by day, the tide of population has rolled onwards. Day by day, for years, there has been a steady increase, in a steadily increasing ratio. From 1650 to 1770, our population doubled; it has since doubled again! Four persons now feed where one fed, four persons reside in the same town where one formerly did. Four persons demand air, water, cleanliness, moral opportunity, and moral checks, where one formerly required them. The change in habits, the crowding together of the population, the struggle to get four times the water from the same fount, the difficulty to maintain air fit to breathe, when four times the number are huddled together where formerly one respired freely,—these are all evils that have gradually made their way, and necessitate the formation of establishments contrived to supply the increased sanitary requirements.

Of all the expedients for the health and comfort of the inhabitants of towns and populous places, that have been devised of late years, none has been more successful than the institution of baths and wash-houses. It has already done much, though in its infancy, and promises to do much more. It is hardly true that we are not a bathing nation, and do not understand the comforts of a complete ablution. Every one will remember that at one time every school-boy learned to swim, and throughout the summer months, wherever there was a river, or a clear sheet of water, it was an eager resort for hundreds of active bathers. In almost every gentleman's garden, where clear water could be got, there was the little bath room, with its quaint Dutch tiles, and little lantern-light, filled with pale stained glass. But now, when every river is polluted by the sewers, when a spreading population has rendered it impossible to bathe in open streams with common decency, when the supply to every bath and closet is guaged by the eager eye of the company's official, and charged at a rate that formerly would have paid the ground rent of the house, it behoves us to have resort to other means, and to supply, by the aid of science, that which circumstances beyond our control have deprived us of.

Again, in open towns, when every house had its garden, and the chimneys were so few that the dreaded enemy of the housewife, " the blacks", did not undo her work,—when, in case of rain, there were out-buildings in which the reeking linen might be suspended, and so the domestic hearth kept free, the necessity for the artificial system of washhouses was not felt; but, when dwellings are crowded close together,—when gardens and yards are swallowed up by bricks and mortar,—when chimneys are multiplied, and out-buildings become rare and dear,—when water is scarce, and fuel expensive,—then is the value of this system felt and acknowledged.

Like most salutary institutions, it has been of slow growth.

It originated at Liverpool, as long back as the year 1832, when first it was proved that the best check to cholera was cleanliness. In one of the poorer parts of the town, the wife of a labourer rented a small out-house, in which she had the wealth, not

> "Ex ære lebetas
> Cymbiaque argento perfecta, atque aspera signis",—

but a common washing copper. By the kind subscription of some ladies, aided by the weekly contribution of the mighty sum of a penny from themselves, the neighbours were supplied with hot water. An ingenious network of cords was stretched from back window to back window, and by these humble means, directed and assisted by the kindness of these ladies, no less than eighty-five families per week were relieved from the nuisance and unhealthiness of washing in their own crowded apartments. This suggested the idea of building a set of common washhouses, and uniting the advantages of bathing to them; and in May 1842, the first regular establishment was opened at Liverpool. It succeeded so well, that it was soon followed by one of six times the size, the continued success of which was so great, that public attention was called to the subject throughout the country. It was not, however, till October 1844, that a public meeting was held at the Mansion House on the subject, and strenuous efforts made to erect an establishment in the metropolis. So great, however, were the difficulties, that it was not till November 1845, that possession was obtained of the ground, and the first stone laid in December of that year. Difficulties, delay, and expense of every kind, seemed flung in the way of the enterprise, and one-half the establishment only could be opened by July 1847; in the meantime, the committee had, with great exertions, obtained an act of parliament to encourage the establishment of public baths and washhouses. It is unnecessary to relate the history of the struggle, or to state any of the arguments used against the system.

So entirely different, however, have been the results from what was generally anticipated, that instead of thrusting the buildings out of sight in any hole or corner, it was found desirable to place them in the most conspicuous spot, and to make them not only valuable, but ornamental structures.

The bill, which received the Royal assent on the 26th August, 1846, is headed the 9th and 10th Victoria, chapter 84, and is intituled "An Act to encourage the establishment of Public Baths and Washhouses". Of the provisions, the following are those which bear more immediately upon the present purpose :—Sections 3 and 4 enact, that the council of any borough may, if they think fit, adopt the act absolutely; and that the expense of carrying the same into execution shall be charged upon the borough fund, and the income arising be carried to the same; and that a separate account shall be kept, called the "Public Baths and Washhouses Account".

Sections 5 and 6 enact that, on the requisition of ten ratepayers, the churchwardens of any *parish* may convene a meeting of the vestry, giving seven days' notice; and if it be resolved by such vestry that the Act be adopted, a copy of such resolution shall be sent for approval to the Secretary of State, but no resolution shall be deemed to be carried unless two-thirds of the votes be in favour of the same; and that not less than three persons, nor more than seven, be appointed Commissioners for carrying the same into execution.

Sections 24, 25, 26, and 27 give Commissioners power to appropriate borough lands, or parish lands, as the case may be; or, if not, to purchase or rent the same to build baths, washhouses, etc., or convert buildings for that purpose, and alter and amend from time to time; to enter into contracts of all kinds, but no contract above £100 to be entered into without notice by advertisement; if Commissioners think fit, they may purchase existing baths.

Section 31 and 32 empower the Council to make sale and exchange of lands with consent, and also to sell, after seven years' trial, any baths that may be found too expensive to be kept up.

Section 36 enacts, that the number of baths for the labouring classes shall be not less than twice the number of any higher class, if but one; or of all the baths of any higher classes, if there be more than one of such higher class.

In the next year, it was found necessary to amend this act in a few particulars; accordingly, the 11 and 12 Victoria, cap. 61, intituled, "An Act to amend the act for the establishment of Public Baths and Washhouses", received the Royal assent, 2nd July, 1847.

Section 4 incorporates the Lands Clauses Act, 1845, with this Act, but provides that the lands may be taken by agreement.

Section 5 enacts the same proportion of washing troughs for the labouring classes, as for baths, viz., twice the number of higher classes, if only one higher class, or an equal number with all the higher classes, if more than one higher class.

The progress of the establishment of baths and washhouses, as above described, was very slow; there were prejudices on the part of the wealthy, but there were also prejudices on the part of the poor. They called it "washing in public," and no persuasion could induce them to believe that there was not something derogatory in availing themselves of this boon; but they soon found that nothing was further from the fact than publicity. The early frequenters—the sensible few that always lead the way to the first enjoyment of offered privileges—soon found that in the washhouses they were, in fact, more private than in their homes. No critical neighbours could remark on the patched or darned apparel that hung in the back garden; they could bring their week's linen in their little covered basket, wash their scanty wardrobes in their own compartment, dry them in their own separate drying closets, carry them home again, " nobody any the wiser", except themselves, in the discovery of such a cheap, safe, and speedy refuge from all the domestic misery attendant upon the ill-starred " washing day", as formerly conducted. There were no " blacks" falling from neighbours' chimneys on their counterpanes, — no tears of vexation keeping pace with the showers that rained the whole " washing day"; when all these advantages became apparent, the establishments soon became full, and were as popular as they were unpopular before.

The best and most convincing proof of the appreciation in which baths and washhouses are held by the public, and the gradually increased use made of their benefits as they became more generally known, will be best shown by the quotation, from the published returns, of a few simple figures.

At the four first establishments in London the increase has been as follows :—

	Bathers.	Washers.
In 1847	143,794	39,418
1848	160,628	61,690
1849	394,557	75,004
1850	595,797	133,177
1851	647,242	142,251

During the month ended July 1852, the receipts at the (now) six metropolitan establishments have amounted to the sum of £2768 : 5 : 5, against £1506 : 3 : 4 in the same period in 1851. The number of bathers was 199,934, against 104,856 in the corresponding month of 1851, shewing an increase of £1262 : 2 : 1 in money, and 95,078 bathers; in the month of the year 1848 the number was 7,934 bathers, and the receipts then amounted to £91 : 5 : 10 only.

The number of persons who have availed themselves of these advantages has steadily increased, till the number has amounted to five times the demand. The women are obliged to wait for their turn at the tubs, and the number of bathers has so increased, that it has cost considerable study to save time in the making and discharging of each bath, and, consequently, to accommodate a greater number of persons. In an establishment in a provincial town, with a population of 20,000, the number of bathers for the *week* ending August the 21st, was 2,016.

The extraordinary success of these buildings has led to the adoption of the system throughout the country. There are now in London seven establishments; at Liverpool three; and there are baths and washhouses, either complete or in progress, at Manchester, Birmingham, Bristol, Maidstone, Bilston, Norwich, Hull, Preston, Oxford, Wolverhampton, Macclesfield, Nottingham, Bolton, Worcester, York, Exeter, Hereford, Chester, Plymouth, Sunderland, Newcastle, Carlisle, Coventry, Belfast, and Waterford, and they are projected in many other places. In fact, they are found to be self-supporting, with scarce an exception, and in most instances they yield a profit.

So short a time has elapsed since their first establishment, and so great were their early difficulties, that the profits at first were nothing; and even now are not to be compared to what they probably will be. As long back as 1848, however, the Hampstead Road Baths produced a profit of £35 in a few weeks; and at Manchester, in the same year, a profit of £30 was realized. The present statistics shew that at Newcastle, when only opened a little more than a year, they paid 4 per cent. on the outlay, and at Chester 3½ over working expenses.

It is evident that the profits must increase as the utility of the system becomes apparent. This is already sufficiently evidenced in those establishments referred to above, that have been in operation sufficiently long to base any calculation, and which all, both metropolitan and provincial, shew a steady increase year after year. Cold and wet as the month of May 1850, was, the returns of four of the London establishments shew an average of £80 per week received, instead of £51, and there is every reason to believe that the profits will be larger year by year. The management will cost no more, and the only additional outlay is for fuel; and even this will not be increased in a large ratio, as steam must be kept up to a certain pressure, and the drying closets heated to a certain temperature, whether they be used by many or by few.

The returns from the Cornwallis Street Baths, Liverpool, for the year 1852, give: amount received, £1,585 : 7 : 10; working expenses, £1,055 : 2 : 10, leaving a surplus of £530 : 5 : 0. At Birmingham, during some of the summer weeks, the return has been 11,000 bathers, and the receipts £150 weekly. The following abstract of receipts from washers and bathers at this establishment, gives a very satisfactory result, as to the *progress* of these establishments :—

Week ending	Bathers.	Washers.	Total.
Dec. 1851 . . .	£6 : 15 : 4	£3 : 13 : 3	£10 : 8 : 2
Dec. 1852 . . .	13 : 4 : 6	4 : 12 : 3	17 : 16 : 9

Like almost all early experiments, the first establishments have been very costly. It has been found necessary to take down, alter, and refix machinery at an immense outlay; even now it is evident that very great and expensive alterations must take place at many existing establishments before they can be worked effectively and economically.

The combination of practical knowledge, both for the design and construction of the building, and for the adaptation and execution of the machinery, is essential in undertakings of this kind; it is thus only that a unity of arrangement can be preserved throughout, and so a due economy attained.

This consideration is of the utmost importance, as the bare interest of the money, or all extra or unnecessary cost, is a fearful deduction from the profits.

Undue importance is, however, frequently attached to curtailing first outlay in the erection of baths and washhouses, which often in the end proves bad economy, as the extra expenditure caused by any necessary after-addition much exceeds what the entirety would have been if done at first, and the whole is not likely to be so complete; but as it is in some cases a question between a small outlay or no establishment, it may be useful to state that, with favourable position as to site and supply of water, £3,000, or even £2,000, would erect a very useful building, including the best machinery; but it is far better in towns exceeding 18,000 or 20,000 population to make a first outlay of from £5,000 to £6,000.

Two plans are given in Plate I; Fig. 4, representing an arrangement for a large establishment, suitable for the metropolis or a first-rate city, and Fig. 3 such as should be erected for a provincial town with a population not exceeding 20,000;—the subsequent remarks on the details, etc., will generally apply to each of these plans. The larger building contains for men twenty-four first class, fifty-five second class, and three vapour and shower baths, with a plunging bath 16 ft. × 14 ft.; first and second class swimming baths each 65 ft. × 40 ft. On the women's side, fifteen first class, thirty-one second class, with plunging, shower, and vapour baths, similar to men's side. The washhouse department accommodates twenty-one first class, and fifty-two second class stalls, each containing a washing, boiling, and rinsing tub, as well as a drying closet; a washhouse is also shewn in which the business for the establishment, and for washing towels, is carried on. This building could be erected at a cost of about £14,000.

The smaller plan, Fig. 3, is arranged for five first class, and

BATHS AND WASHHOUSES.
Plate 1.

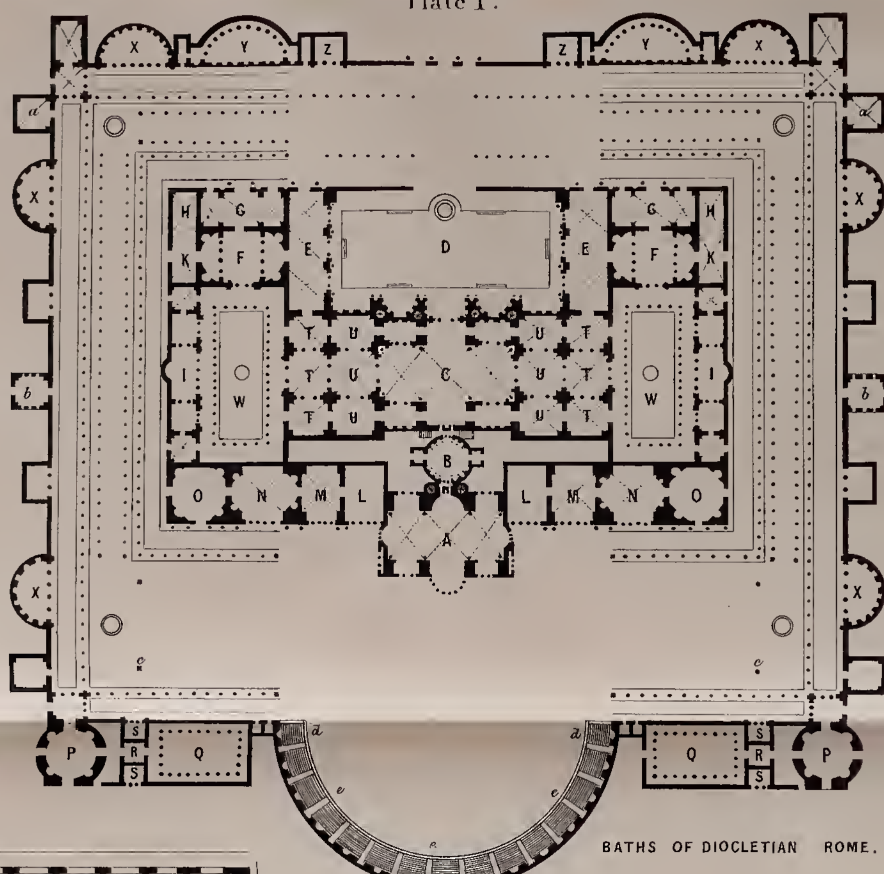
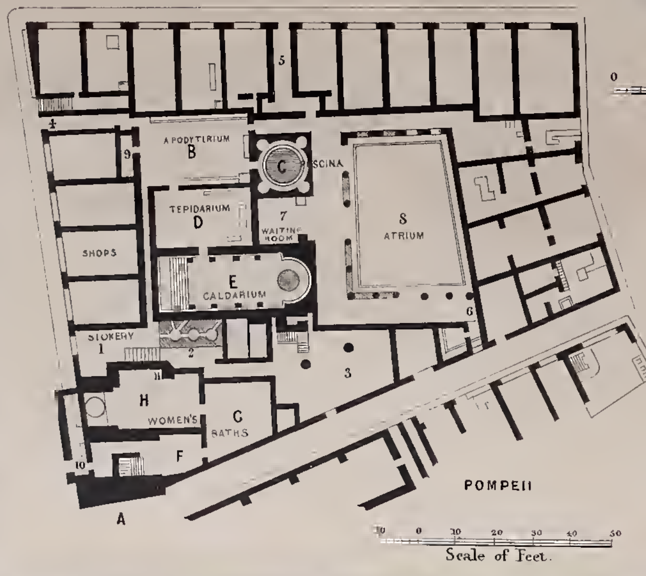


Fig 1

BATHS OF DIOCLETIAN ROME.

Fig 2.



POMPEII

Scale of Feet.

REFERENCE TO FIGS. 3 & 4

- a *Stairs up to Superintendent's Residence, Board Room &c.*
- b *Stairs down to Stokery.*
- c *Vapour & Shower Baths.*
- d *Wash Tubs.*
- e *Drying Closets*
- f *Wringing Machine*
- g *Water Closets*

Fig 3.

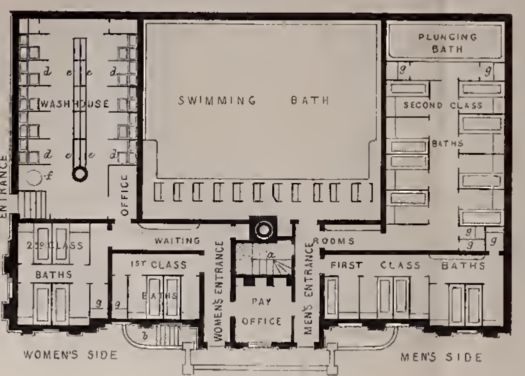
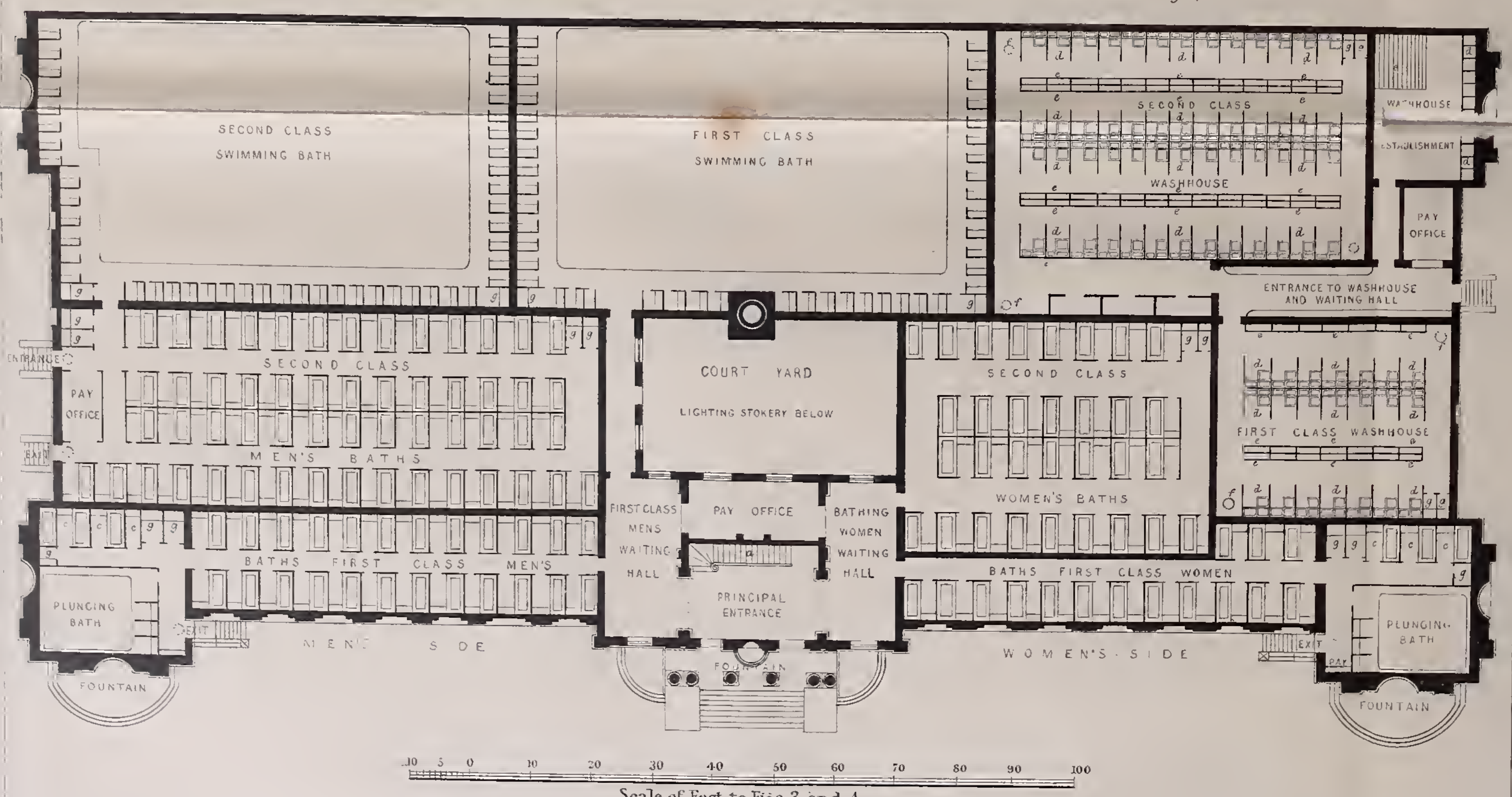


Fig 4



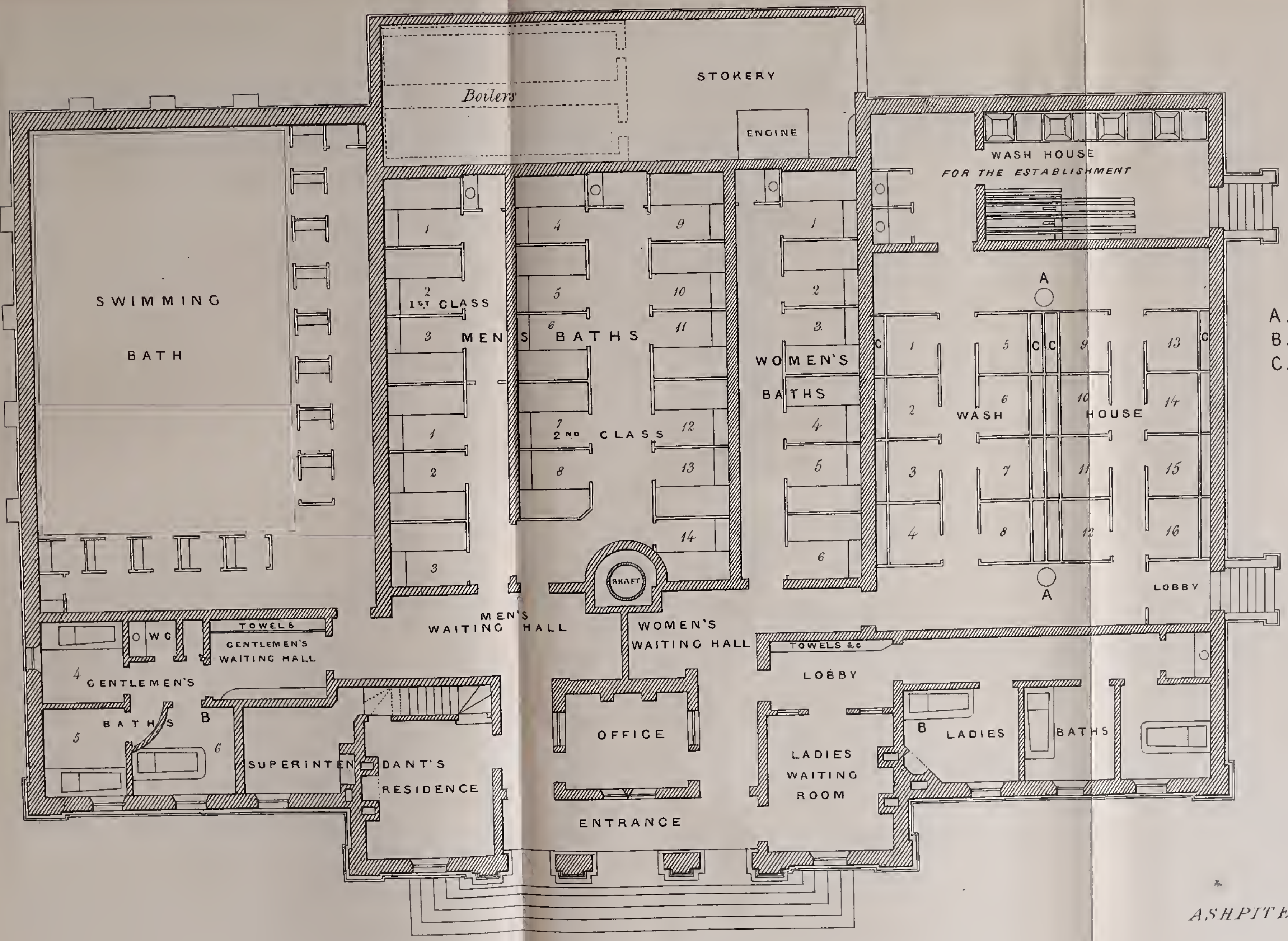
Scale of Feet to Figs.3 and 4.

Ashpitel and Whichcord

Lithographed by Vincent Brooks 421 Oxford St Feb. 1st 1853

No 2.

COST EXCLUSIVE OF WATER SUPPLY £3,600.



Plan of Ground Floor.

A.A. *Wringing Machines.*
B.B. *Baths for Invalids*
C.C. *Drying Closets*
For Details of each Bath & Washing Compartment See Plate No 4.

ASHPITEL & WHICHCORD, Architects.
6 Carlton Chambers, St James's

eight second class men's baths, with a plunging bath 17ft. × 8ft., two first, and four second class women's baths, a shower and vapour bath on each side, and a swimming bath 35ft. × 24ft. The washhouse contains ten washing stalls, arranged precisely the same as the larger plan. The cost of this building is £2,125.

Erections for this purpose should always, if possible, be on one floor only above the basement,—a matter of primary value as regards light, air, ventilation, avoidance of steps, and convenience of arranging pipes, etc.: the only exception being over the entrances, etc., where frequently another story is added, to contain the residence of the superintendant or other officers.

The plan should be made with the greatest compactness to ensure a minimum of cost. The larger establishment shewn covers an area of 2,930 yards, and the smaller of 417 yards.

In the basement should be placed the steam boilers, which, by means of a small engine, perform the duty of pumping water to a great cistern in the roof (of course, if the water is delivered at the level of this cistern by a water company or otherwise, this cost would be dispensed with). The boilers also supply steam for the boiling vessels in the washhouse, for the vapour baths, and any excess is used for warming apartments, heating towel closets, etc. Where inundation is to be apprehended, and it is consequently unadvisable to place the machinery in the basement, the stokery, etc. might be put at the back.

It is important here to notice the great economy attained in a minute adaptation of the waste heat and steam as well as water, etc., all of which may be made available, and thus tend to economise the working expenses.

It is easy, for example, to turn the overflow pipes, also the condensed water, etc. into the swimming bath instead of the drain, that the waste steam, instead of blowing away, should perform some duty; if no better adaptation can be found, it is always useful in the shaft to increase the draft and destroy the blackness of the smoke. In the Lambeth establishment, the authors intend to use the exhaust steam from the pumping engine as the medium of heating the two very large swimming baths averaging 150 feet long by 40 feet wide, and to turn the steam in at an angle with the side of the bath to cause a circulating motion of the water. It is worthy of remark, that in this establishment, the great first class swimming bath is to be filled by means of a fountain, which will keep the surface of the water in rippling motion, and it is believed that, while the latter will prevent the accumulation of what is ordinarily known as scum on the surface, the former will keep a due admixture of the steam-heating medium with the water.

To minor matters, such as the due clothing of pipes and boilers, and all heated vessels, it seems almost unnecessary to refer, and yet, satisfactory results are frequently frustrated for want of due consideration on these points.

As before remarked, much attention has been given to the production of a valve for the supply of water to fill and empty the baths. A patent for an invention for this purpose has been taken out by the authors of this essay, and found to act very

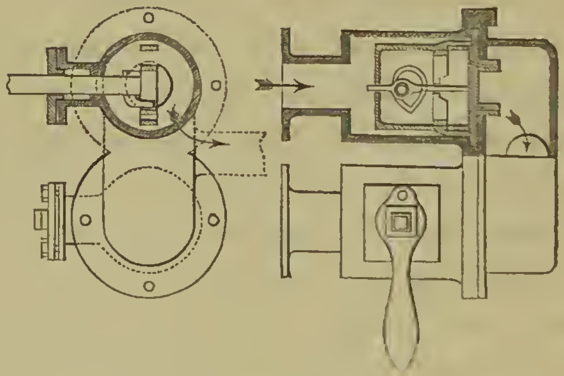


Fig. 5.

satisfactorily; the peculiarity consists in the pressure being at the back of the valve, and in the conical shape of the ground surfaces, into which the column of water at the back always tends to force the plug; the same form insuring tightness with wear. In the centre is a mixing box for the hot and cold water, delivered on either side, so that an equable temperature is maintained, obviating the difference in the degree of expansion and contraction; the cause of leakage in most articles for similar purpose.

A bath can be got ready with these valves in thirty-two seconds. They are manufactured and executed in a very superior manner by Sylvester and Co. of Great Russell Street, Bloomsbury, and Potter of South Molton Street.

As, in establishments of this kind, it is important every thing should be as clean and bright as possible, it is essential that the chimney should be lofty and active, and, if possible, one shaft carrying everything away with it. This shaft is also of great use to ventilate the apartments, especially the washhouse.

The greatest care should be taken in procuring a pure soft water for the purposes of washing and bathing. The value of softness in water, for such purposes, can hardly be estimated, and should always be a leading point of consideration in the selection of a site. The fact that, where hard water is used, 10*s*. for each person is the cost of soap and water—6*s*. 8*d*. for soap and 3*s*. 4*d*. for water in the London district—proves how much economy, in large establishments, is to be attained by a due attention to the quality of this article. Animal deposit and organic impurity may be easily removed by filtering; but the lime, causing hardness, is not so got rid of. The process of filtration is simple and inexpensive, except where the water is delivered by companies who have not provided proper filter beds.

In the evidence given by Dr. Clarke, printed in the first Report of the Commissioners of the Health of Towns Act, he states, that "Supposing we had the choice of several waters, there is no single quality to which I should attach more importance than *softness*." And again, "With regard to the softness of water, this quality is of importance; not merely for the saving of soap, and agreeableness for washing and bathing, but also in respect to the wear and tear of linen due to hard water."

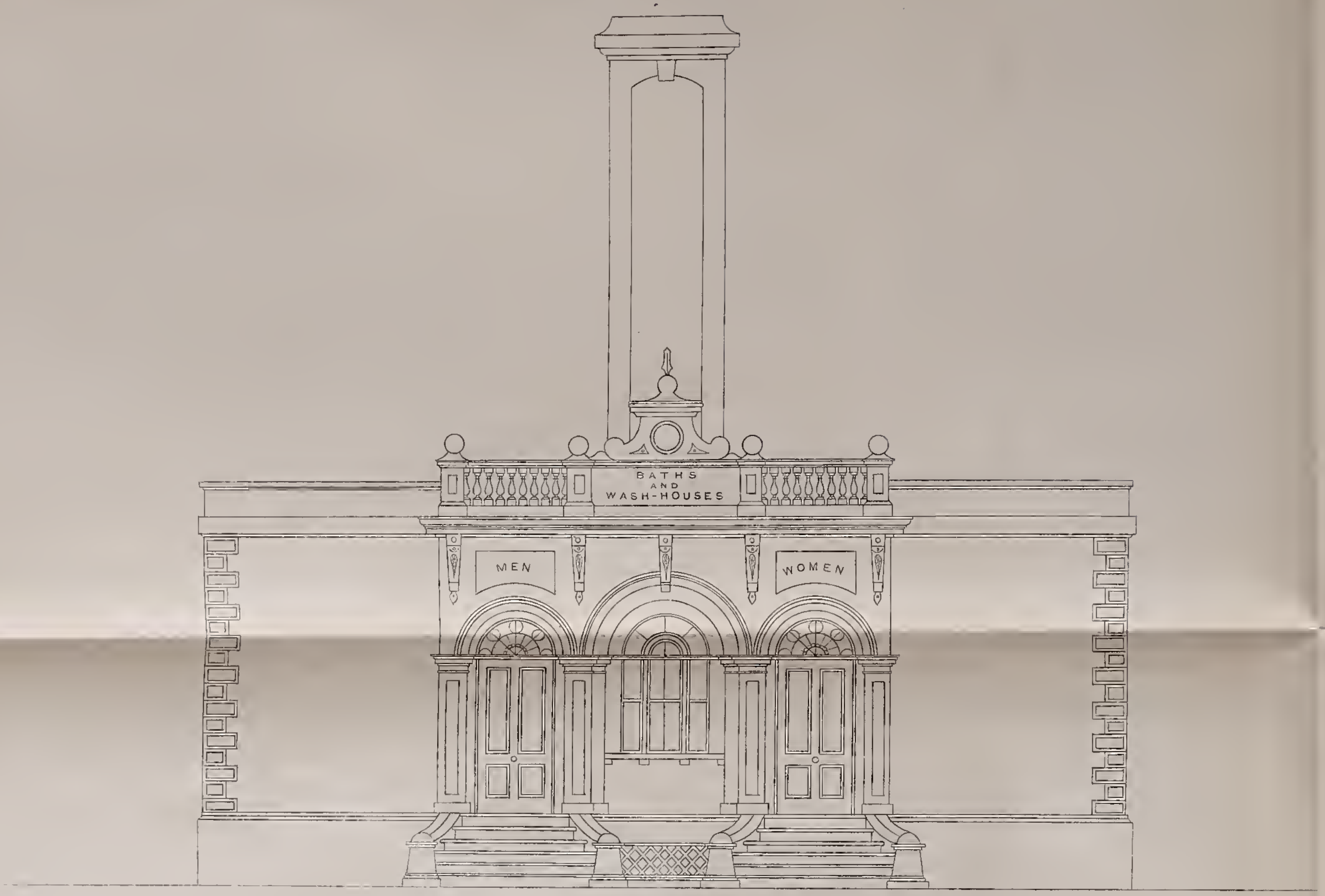
Dr. Lyon Playfair, in his lecture on the chemical properties involved in the manufactures of the Great Exhibition, gives the following astounding figures in connexion with this subject.

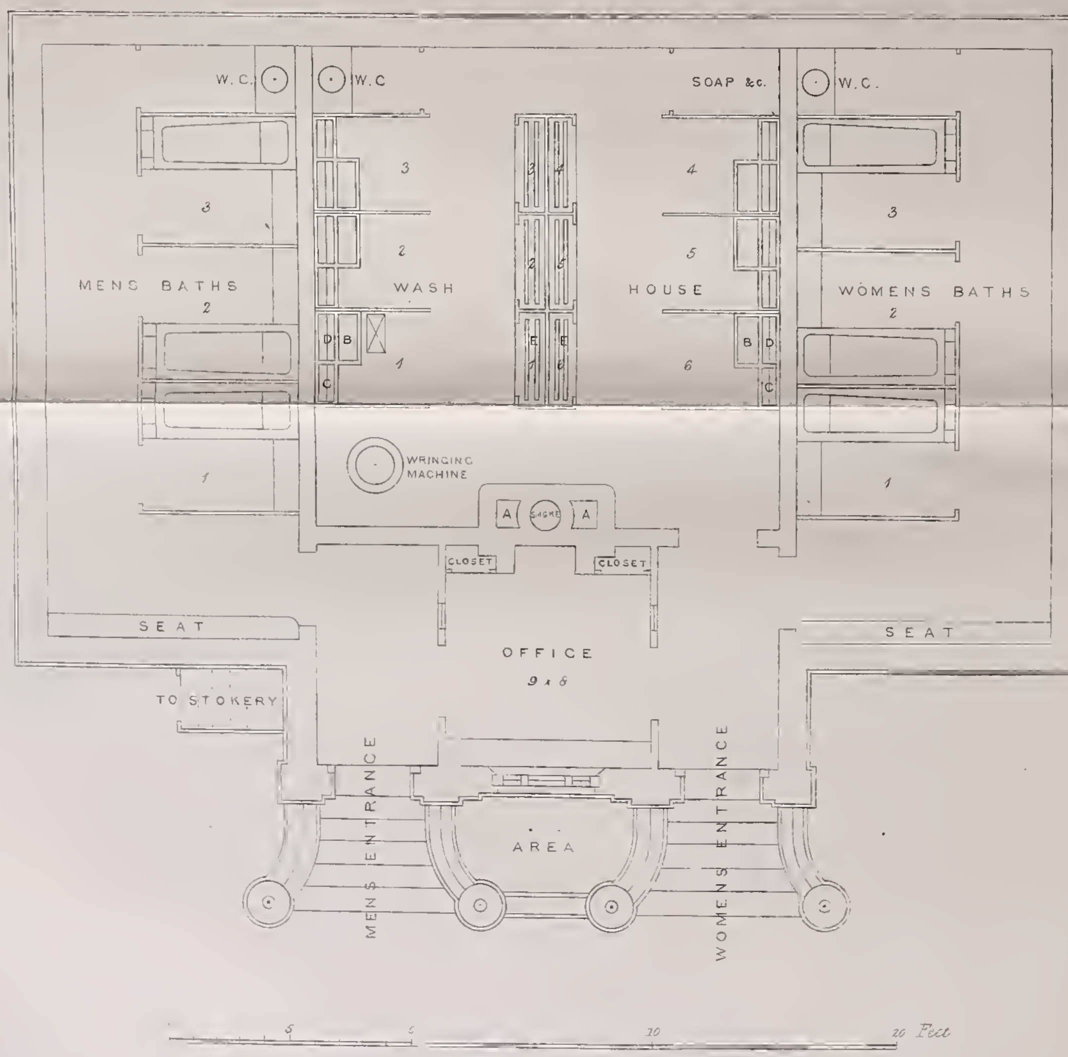
"The annual charge of washing to the metropolis is £1,535,060, which is equal to above a twenty-fifth of the whole capital invested in the cotton manufactures of the United Kingdom. Hard water usually contains lime; and in washing, that earth unites with the fatty acid of soap, producing an insoluble body, of no use as a detergent. For 100 gallons of Thames water, 30 oz. of soap are thus wasted before a detergent lather is formed. In personal ablution, we economise this excessive waste by the uncomfortable practice, universally followed in London, of taking about an ounce of water into the hands, and converting it into a lather, the water in the basin being only employed to rinse this off, instead of aiding in the detergence. But in washing linen, this plan cannot be followed, every particle of lime being removed before the soap becomes useful; this, as a matter of economy, is frequently accomplished by carbonate of soda, as being cheaper than soap. The amount of soap and soda thus wasted in the metropolis has been stated to be equal to the gross water rental."

In arranging buildings for the purposes of baths and washhouses, there should be an absolute division effecting an entire separation of sexes. The centre should comprise a residence for the superintendant, waiting halls for both men and women, pay office, etc., with the swimming baths, etc.

SMALL ESTABLISHMENT

COST £800.





A. A. *Ventilation Flues*
B. B. *Wash Tubs*
C. C. *Rinsing Tubs*
D. D. *Boiling Tubs*
E. E. *Drying Closets*
Stokery under office

ASHPITEL & WHICHCORD
8, Carlton Chambers S^t James's.

Cox Brothers) & Wyman, 74–75, Great Queen Street.

At the establishment at Maidstone, a range of private bath rooms have been constructed, and fitted up in a superior manner as regards furniture, and with a towel closet heated with a coil of pipes, and with the apparatus for vapour or shower baths. These rooms average 9 ft. × 8 ft., making a superior class, reserved for a higher rate of charge.

The swimming baths should be made with a surface light and clean, and it is important it be non-absorbent; glazed bricks have in some cases been used, and are defective only in the number of the joints: slabs of terra cotta, 9 ins. square, and $2\frac{1}{2}$ ins. thick, are made by the Llysnewydd brick Company, Swansea, with a glazed surface, in white and blue colours; these have been used, and form a very beautiful bath; the dressing boxes ranged round the bath, are constructed of wood framing, they are each 4 feet long, by 3 feet wide, with a seat, hat pegs, and a wood foot grating in each.

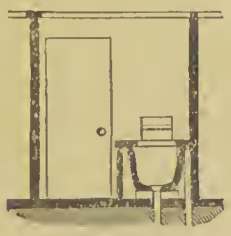


Fig. 8, Section.

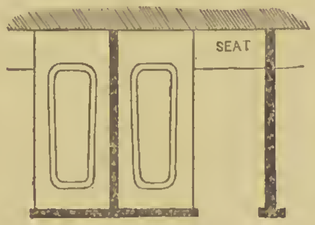


Fig. 6, Plan.

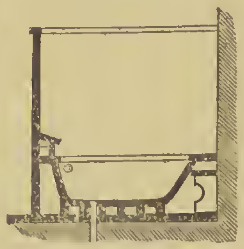


Fig. 7, Section.

Baths are made of copper, zinc, glazed tiles, slate, marble, or of glazed porcelain in one piece. Very many experiments have been made, and a variety of conflicting opinions given on the relative value of each material; the objections to those which require a painted or enamelled surface are obvious, in the action which the water and soap are found to exert on the composition of these surfaces, which contain generally a large amount of oleaginous matter.

The glazed tile baths are much approved, and of late years have been very generally used; but by far the most perfect bath is that of glazed porcelain in one piece.

The walls or sides of these are about two inches thick, in which fine clay, china clay, and the glaze, are so assimilated, that the two clays are of the same porosity, bear the same heat, and expand and contract together, and the glaze will melt only when the fine clay is sufficiently burned. These baths avoid the only objection to the tile baths, viz. the frequent joints, and consequent irregularity of surface. They are made of the following dimensions, 5 ft. 3 ins. long, 2 ft. 4 ins. wide at head, 2 ft. at foot, and 1 ft. 11 ins. deep. They have been brought to perfection after a long and expensive series of experiments, for which much credit is due to Mr. Rufford of Stourbridge, the manufacturer, and his energetic coadjutor, Mr. Paul Mathews.

In fitting up these bath rooms, it is important, as much as possible, to adopt the use of material which is not injured by steam or moisture; and for this reason, the looking-glass frame, soap dish, handle to door, clothes' pegs, etc., are all made in porcelain, so as not to be liable to rust or contract dirt. An elaboration of this is intended to be executed by the Llangollen Slate Company, in the new Lambeth Baths and Washhouses. The first class men's baths are placed in a gallery, round a portion of the great swimming bath, supported by iron brackets and columns. The slate divisions and the doors will be enamelled, so as to give them a pure white glaze.

The divisions between the baths and washing boxes shown in the plans, and also in the details, Figs. 6 to 12, are made of slate, with slate doors, answering all the purposes of privacy, at the same time that no impediment is offered to the free circulation of air throughout the one large apartment.

The compartments in the washhouses shown on the plans, are each complete in themselves, viz. they should contain a wash-tub, B, Fig. 9; a vessel for boiling clothes, C; a tub for rinsing, A; D, wringing board; and a drying closet, as shown Fig. 10. The arrangement of these compartments is exhibited in

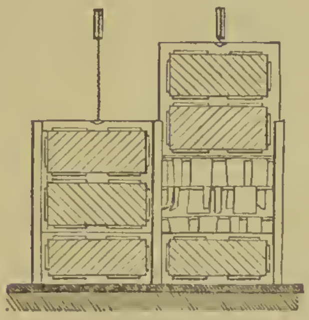


Fig. 11.

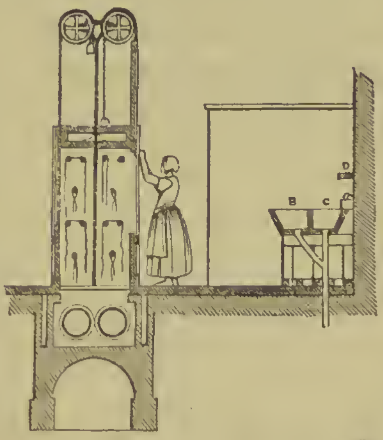


Fig. 10.

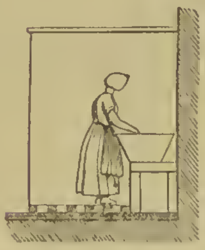


Fig. 12.

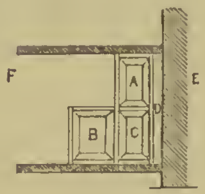


Fig. 9.

detail in Fig. 9, plan of tubs; Fig. 10, section of washing and drying closets; Fig. 11, elevation of two drying closets, one with the door raised, the other shut; and Fig. 12, section of stall at E F, on Fig. 9. The rinsing tub is a feature not universally adopted: it has the great advantage of saving the necessity of discharging the heated and softened water from the wash-tub, and thus economizes fuel. Each compartment should have a perforated foot-board, raised a little above the floor, and the tubs should be heated by steam.

It is advisable, when the site will admit of such an arrangement, that a separate entrance should be given to the washhouse, distinct from the baths, that no confusion in the different departments should arise. In the former, hydro-extractor wringing machines are provided to each group of washing compartments, in the position shown on the plans; these, in the course of a few seconds, remove fifty per cent. of the moisture from the linen, and consequently facilitate the rapidity of drying.

The following table of the results of washing, wringing, and drying, at the Goulston Square establishment, exhibits the value of these wringing machines:—

Description of Article.	Weight when dirty and before being washed.		Weight after being washed.		Weight after the wringing process.		Weight when taken from the drying-chamber dry.		Time employed wringing.	Time employed drying.	Temperature of the drying chamber.
	lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.	Min.	Min.	Deg.
12 bathers' towels	7	11	16	12	11	12	6	12	2	30	200
ditto	7	13½	16	15	11	13	6	14½	2	25	210
ditto	7	15	17	1½	11	14½	6	15½	2	35	190
3 fine sheets .	4	15½	13	2	8	4	4	3½	2	15	180
3 middling do. .	5	4	14	1	8	3	4	12	2	25	190
3 coarse ditto .	7	8	16	2	9	0	6	15½	2½	30	190
3 small blankets	6	15	22	15½	9	10½	6	3	2	15	200
ditto	6	10	21	4	9	1	6	0	2½	15	200
3 large ditto .	9	1	24	14	12	3	8	12	3	25	210

The object of contriving the whole process of washing and drying in each compartment, is obviously for the sake of privacy; and, in provincial towns, must be of even more importance than in the metropolis, where it is less likely that the occupant will meet with any one of her acquaintance. It is necessary to seek an arrangement that shall prevent the necessity of exposing the possibly ragged linen of a washer to her neighbours, or congregate any number of them together—a rendezvous for gossip.

The method of having the drying horses together in one place, away from the washing box, although the easiest to construct, is decidedly objectionable, being a place of lounging, and does away entirely with the comfort and privacy the other plan gives; and this is, as before observed, a point of vastly greater importance in a provincial town than in the metropolis.

The system formerly pursued of heating drying closets by steam has been found so imperfect, that other methods have been sought, by which greater rapidity in drying could be attained. It is well known by brick makers, that however hot the day may be, the bricks will not dry unless there be some movement in the air, to carry off the vapour as soon as formed; the same fact is also observed in the process of drying hops; in haymaking, and, in fact, everywhere in which quick drying is necessary. Injected currents of highly dessicated air in rapid volumes, imitating the rush of the hot winds of eastern climates, whose rapidly drying powers are the wonder of Europeans, will be found to be the most successful principle.

At Maidstone, where there is a steam-engine, an apparatus something on the principle of the centrifugal pump has been fitted up for this purpose. At Bilston and other places, where there is no engine, a system has been adopted of causing air to pass through red-hot coke, and thence diffusing it by a series of pipes, so as rapidly to circulate through the wet linen.

The results of the first described closets, with a temperature of only 130°, has been that heavy blankets have been perfectly dried in twenty minutes, and light articles in *three minutes*.

No accommodation is necessary for ironing and mangling. In some of the establishments, where they have been provided, they have been found comparatively useless, even in London; and in a provincial town, we should think them positively objectionable, as the ironing is not unhealthy to be done at home, and the mangling is a small source of living to many poor persons, which would be lost if it were done in a public establishment.

In the report also of the Goulston Baths, in 1848, after detailing the number of washers, driers, etc., it is observed: "No ironing appears to have been done." If it be considered advisable, however, to have such accommodation, a room is always easily added for that purpose, as it is entirely distinct from the other processes.

An addition of great value has been made to these establishments at Liverpool, and, up to the present time, we believe, at Liverpool only: a place set apart for washing infected linen,—it should be entirely detached,—in which the clothes of persons ill of infectious disorders are received and washed for them without any charge, a note from a medical man being all that is required to procure this aid.

A novel addition of great value to the washing establishment, is intended to be made at the Lambeth Baths and Washhouses, in adding an infant school, where the poor washers may safely leave their young children, while they are engaged in the wholesome duty of purifying the household linen. The fact of being obliged to leave an infant at home, exposed to all the chances of accident and neglect, has deterred at least one-half of those who would gladly have accepted this boon, afforded by the new washhouse, from availing themselves of it. In this instance, the authors have given a room for the children of those engaged within; and the kindness of the directors will provide a competent person to assist in their care, and, as much as can be, in the development, of their youthful minds.

Buildings for the purposes of baths and washhouses should be erected in a substantial manner; all superfluous ornament, and the adaptation of Gothic or other masks, ought to be forbidden; a character of cheerfulness should be given to them, which the architect will know well how to stamp with an expression of its purpose.

The internal fittings should in all cases be of the simplest and strongest kind, and, wherever possible, of a material not liable to corrode: the rooms should be lofty, finished quite plainly, and left white, with a strict avoidance of dark corners, or places in which dirt could accumulate. The roof shown in Fig. 13, constructed on the ridge and furrow principle, of substantial construction, and covered partly with glass and partly with slate, is admirably adapted for buildings of this character.

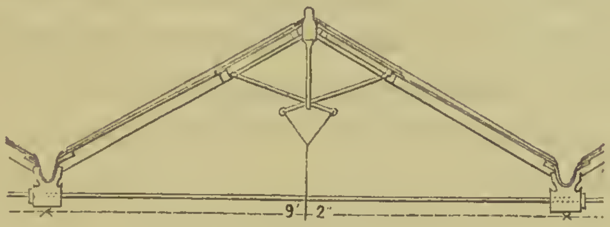


Fig. 13.

One of the most important considerations in the erection of these establishments, is the selection of a fit site.

First, then, it should be in a position in which it could be supplied with an unlimited quantity of *soft* water; secondly, it should occupy a prominent position, to be seen by every one; thirdly, it should be central, and have good approaches.

The principles above detailed, but in a modified form, may be well carried out for the use of hotels, and even of private houses, with the most beneficial effects as regards comfort and economy. In hotels, particularly, the saving of labour and time in the washing, and the convenience of thoroughly drying and airing linen for immediate use would be most sensibly felt; and by combining apparatus for the baths with these, would prove a very beneficial speculation.

Large sums are cheerfully spent for the shelter of the lunatic, and for the punishment of the culprit, and it is hoped that there will be no stint in the expenditure of much less sums for the improvement of the moral and physical condition of the labourer; the more so, as the money is but lent, as it were, for a time. The union house, the lunatic asylum, the prison, are all connected with saddening ideas—all are necessary evils;

but every establishment that elevates man in his moral organization diminishes these evils; and if it be true, as the concurrent testimony of all wise and good men has confessed, that "cleanliness is next to godliness", we must rank these institutions as next in worth and importance to our schools. Even if we take lower and more selfish views, we must consider that these establishments are self-supporting, if not remunerative; and we must remember that the pestilence of the nineteenth century, though it requires dirt and filth to generate its first breathings, yet, when arrived at vigour and activity, it sweeps on like the simoon, and strikes down the rich as well as the poor. It is too much to expect of any human institution that it shall eradicate all evil, and cure all disease; but when a remedy is known, either moral or physical, heavy is the responsibility of those who can use it, and will not.

ASHPITEL AND WHICHCORD,
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